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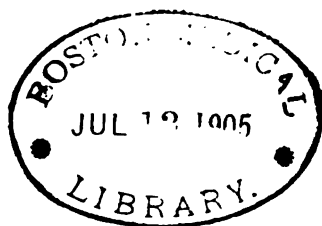
**EXHIBITING
A CONCISE VIEW**

**OF THE
LATEST AND MOST IMPORTANT DISCOVERIES
IN
MEDICINE, SURGERY, AND
PHARMACY.**

**VOLUME SIXTY-THIRD.
1845.**

**EDINBURGH:
PRINTED FOR ADAM AND CHARLES BLACK:
LONGMAN, BROWN, GREEN, & LONGMANS, LONDON:
JOHN CUMMING, AND HODGES & SMITH, DUBLIN.**

1845.



4870



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EDINBURGH
MEDICAL AND SURGICAL JOURNAL.

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The Principles of Surgery. By James Miller, F. R. S. E., F. R. C. S. E., Professor of Surgery in the University of Edinburgh. 12mo. Pp. 716. Edinburgh, 1844.

A Practical Treatise on Midwifery ; exhibiting the present advanced state of the Science. By F. J. Moreau, Officer of the Legion of Honour, and of the order of Leopold, Professor of Midwifery and the Diseases of Women and Children in the Faculty of Medicine of Paris, &c. &c. Translated from the French by Thomas Forrest Betton, M. D., and edited by Paul B. Goddard, A. M., M. D., Lecturer on Anatomy and Demonstrator in the University of Pennsylvania, &c. &c. &c. With Eighty Plates, comprising numerous separate illustrations. Philadelphia, 1844. 4to. Pp. 235.

Introductory Address to the Students of University College, at the Opening of the Winter Session in the Faculty of Medicine, 1844-45. By Samuel Cooper, Professor of Surgery in the same College, Vice-President of the Royal College of Surgeons in England, &c. London, 1844. 8vo. Pp. 34.

Vestiges of the Natural History of Creation. London, 1844. Post 8vo. Pp. 390.

Facts and Observations in Medicine and Surgery. The Gleanings of Ten Years of active General Practice, and having particular reference to Fractures and Dislocations, Gunshot Wounds, Calculus, Insanity, Epilepsy, Hydrocephalus, the Therapeutic Application of Galvanism, and Fibrinous Diarrhœa. By John Grantham, F. R. C. of Surgeons of England. London, 1844. 8vo. Pp. 216.

A Manual of Elementary Chemistry, Theoretical and Practical. By George Fownes, Ph. D., Chemical Lecturer in the Middlesex Hospital Medical School, and to the Pharmaceutical Society of Great Britain. With numerous Wood-engravings. London, 1844. 12mo. Pp. 566.

A Practical Inquiry into the Value of Medicinal Naphtha in Tubercular Phthisis. By Edward Octavius Hocken, M. D., &c. London, 1844. 8vo. Pp. 72.

Remarks on the Mortality of Exeter ; together with Suggestions towards the Improvement of Public Health ; being a Letter addressed to Henry Hooper, Esq., the Right Worshipful the Mayor of Exeter. By Thomas Shapter, M. D., Physician to the Dispensary, author of the Climate of Devon. London, 1844. 8vo. Pp. 32.

On the Changes induced in the situation and structure of the Internal Organs, under varying circumstances of health and disease ; and on the Nature and External Indications of these Changes. (From the 12th volume of the Transactions of the Provincial Medical and Surgical Association.) By Francis Sibson, Resident Surgeon to the General Hospital near Nottingham. Worcester, 1844. 8vo. Pp. 268.

Outlines of Military Surgery. By Sir George Ballingall, M. D., Pro-

essor of Military Surgery in the University of Edinburgh. Edin. 1844. Third Edition, 8vo. Pp. 568.

Researches and Observations on the Causes of Scrofulous Diseases. By J. G. Lugol, Physician to the Hospital of St Louis, &c. Translated from the French, with an Introduction and an Essay on the Treatment of the principal Varieties of Scrofula. By W. Harcourt Ranking, M. D., Cantab. Physician to the Suffolk General Hospital. London, 1844. 8vo. Pp. 306.

Urinary Deposits, their Diagnosis, Pathology, and Therapeutical Indications. By Golding Bird, A.M., M.D., Assistant Physician to, and Lecturer on Materia Medica at Guy's Hospital, &c. London, 1844. Post 8vo. Pp. 323.

An Essay on the Philosophy of Medical Science. By Elisha Bartlett, M.D., Professor of the Theory and Practice of Medicine in the University of Maryland. Philadelphia, 1844. 8vo. Pp. 312.

The Medical Remembrancer, or Book of Emergencies, in which are concisely pointed out the Immediate Remedies to be adopted in the First Moments of Danger, from Poisoning, Drowning, Apoplexy, Burns, and other Accidents, with the Tests for the principal Poisons, and other useful Information. By Edward B. L. Shaw, M.R.C.S., and L.A.S. 2d Edition. London, 1845. 32mo. Pp. 108.

Die Angebornen Krankheiten des Herzens und der Grossen Gefasse des Menschen nebst Untersuchungen uber der Blutum lauf des Menschlichen Foetus. Von Dr Herman Friedberg, Pract, aerzt, &c. Leipzig, 1844. 8vo. Pp. 170.

A Treatise on Poisons in relation to Medical Jurisprudence, Physiology, and the Practice of Physic. By Robert Christison, M.D., F.R.S.E., Professor of Materia Medica in the University of Edinburgh; F.R.C. Phys., &c. 4th Edition. Edinburgh and London, 1845. 8vo. Pp. 986.

The Principles and Practice of Obstetric Medicine and Surgery in reference to the Process of Parturition. With One Hundred and Ten Illustrations on Steel and Wood. By Francis H. Ramsbotham, M.D., Fellow of the Royal College of Physicians, &c. &c. London, 1844. 8vo. Pp. 732.

The Medico-Chirurgical Review and Journal of Practical Medicine. Edited by James Johnson, M.D., Physician-Extraordinary to the late King. New Series. No. 82, October 1844, being No. 42 of a Decennial Series.

The British and Foreign Medical Review, or Quarterly Journal of Practical Medicine and Surgery. Edited by John Forbes, M. D., &c. No. xxxvi. October 1844. London.

The London Medical Gazette, Session 1844, 1845. No. 51, 1843, 1844, September 20. No. 1, October 4, 1844. No. 11, 13th December 1844.

Weekly Tables of Mortality for the Metropolis. No. 38, Saturday, 21st September 1844. No. 50, Saturday, 14th December 1844.

Provincial Medical and Surgical Journal. Edited by Robert J. N. Streetter, M. D. No. 26, 25th September 1844 to Wednesday, 18th December 1844.

The American Journal of the Medical Sciences. Edited by Isaac Hays, M.D., &c., No. xvi. New Series. October 1844. Philadelphia.

The American Journal of Insanity. Edited by the Officers of the New York State Lunatic Asylum. Utica, October 1844. No. 2, Vol. i.

L'Experience, Journal de Medecine et de Chirurgie, No. 377, 19 Septembre 1844. No. 383, 31 Octobre 1844.

The Northern Journal of Medicine. Edited by William Seller, M. D., and T. L. Kemp, M.D. Nos. v. vi. vii. 1844.

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Outlines of Chemistry, for the use of Students. By William Gregory, M. D., Professor of Chemistry in the University of Edinburgh. With numerous engravings on wood. Part I. Inorganic Chemistry. London, 1845. 12mo. Pp. 236.

The Philosophy of the Moving Powers of the Blood. By G. Calvert Holland, M. D., Physician Extraordinary to the Sheffield General Infirmary, &c. &c. London, 1844. 8vo. Pp. 308.

Human Magnetism ; its claims to Dispassionate Inquiry. Being an attempt to show the Utility of its Application for the Relief of Human Suffering. By William Newnham, Esq., F. R. S. L., Author of the Reciprocal Influence of Body and Mind, &c. London, 1845. Post 8vo. Pp. 432.

Essay upon Cretinism and Goitre. By Edward Wells, M. D. late Fellow of New College, Oxford, &c. London, 1845. 8vo. Pp. 69.

The Retrospect of Practical Medicine and Surgery, being a Half-yearly Journal, containing a Retrospective View of every Discovery and Practical Improvement in the Medical Sciences. Edited by W. Braithwaite, Surgeon to the Leeds General Eye and Ear Infirmary, &c. &c., Vol. x. July—December 1844. London, 1845. 12mo. Pp. 300.

General Report of the Royal Hospitals of Bridewell and Bethlem, and of the House of Occupations, for the year ending 31st December 1844. Printed for the use of the Governors. London, 1845. 8vo. Pp. 112.

The Chemistry of Vegetable and Animal Physiology. By Dr G. J. Mulder, Professor of Chemistry in the University of Utrecht. Translated from the Dutch by Dr P. F. U. Fromberg, First Assistant in the Laboratory of the Agricultural Chemistry Association of Scotland. With an Introduction and Notes, by James F. W. Johnston, F. R. S. S. L. & E. Edinburgh, 1845. 8vo. Pp. 184.

Anatomical and Pathological Observations. By John Goodsir, F.R.S.E., and Harry D. S. Goodsir, M. W. S. Edinburgh, 1845. 8vo. Pp. 127.

Practical Observations and Suggestions in Medicine. By Marshall Hall,

M. D., F. R. S. L. & E., Fellow of the Royal College of Physicians, &c. &c. &c. London, 1845. Post 8vo. Pp. 360.

Mesmerism True—Mesmerism False; a Critical Examination of the Facts, Claims, and Pretensions of Animal Magnetism. Edited by John Forbes, M. D., F. R. S., &c., Fellow of the Royal College of Physicians. With an Appendix, containing a Report of Two Exhibitions by Alexia. London, 1845. 8vo. Pp. 76.

The Anatomy of Sleep, or the Art of Procuring Sound and Refreshing Slumbers at Will. By Edward Binna, M. D. Second Edition. With Annotations and Additions by the Right Hon. the Earl of Stanhope. London, 1845. Pp. 508.

An Introduction to the Study of Homœopathy. Edited by J. J. Drysdale, M. D., Edinburgh, and J. Rutherford Russell, M. D., Edinburgh, Editors of Fletcher's Elements of General Pathology, and the British Journal of Homœopathy. London, Edinburgh, 1845. 12mo. Pp. 253.

Medical Education. A Lecture delivered at King's College, London, by Forbes Royle, M. D., F. R. S. L. & S., Professor of Materia Medica and Therapeutics, King's College. London, 1845. 12mo. Pp. 63.

The Medical Examiner and Record of Medical Science. Edited by Robert M. Huston, M. D., &c. Vol. vii. Nos. 20, 21, 22, 23, 24, 25. 5th October—28th December 1844. Philadelphia, 1844.

The Medico-Chirurgical Review and Journal of Practical Medicine. Edited by James Johnson, M. D., &c. New Series. No. 83, January 1845.

The British and Foreign Medical Review, or Quarterly Journal of Practical Medicine and Surgery. Edited by John Forbes, M. D., &c. No. xxxvii. January 1845. London.

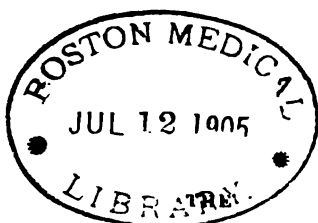
The London Medical Gazette, Session 1844, 1845. No. 12, 30th December 1844. No. 25, 15th March 1845.

Weekly Tables of Mortality for the Metropolis. No. 51, Saturday, 20th December 1844. No. 11, Saturday, 15th March 1845.

Provincial Medical and Surgical Journal. Edited by Robert J. N. Streeten, M. D. No. 39, Tuesday, 24th December. No. 12, Wednesday, 19th March 1845.

The American Journal of the Medical Sciences. Edited by Isaac Hays, M. D., &c. No. xvii. New Series. January 1845. Philadelphia.

Gazette Medicale Belge, Journal Hebdomadaire de Litterature, de Critique, et de Nouvelles Medicales. Numero 11. Dimanche, 16 Mars 1845.



EDINBURGH MEDICAL AND SURGICAL JOURNAL.

1. JANUARY 1845.

PART I. ORIGINAL COMMUNICATIONS.

ART. I.—*An Experimental Inquiry into the Pathology and Treatment of Asphyxia.* By JOHN E. ERICHSEN, Lecturer on General Anatomy and Physiology at the Westminster Hospital, London.

HAVING had the honor of being appointed by the General Committee of the British Association for the Advancement of Science, at the meeting at Manchester in the year 1842, one of a commission, consisting of Dr Sharpey and myself, to make an Experimental Inquiry into the subject of Asphyxia, I have much pleasure in laying the following Report before the Association. This would no doubt have been much more deserving of the attention of the members of this institution than it at present is, had not the pressure of other engagements prevented my most distinguished friend and coadjutor, Professor Sharpey, from continuing conjointly with me the investigation of this interesting but very intricate subject. It would be useless to recapitulate the precise share that each of us took in the inquiry; but I may state in general terms, that in several of the experiments that it was necessary to have recourse to, I had, more particularly during the earlier part of this investigation, the great advantage of that gentleman's guidance and most valuable co-operation; that others were performed altogether by myself; and that I alone am answerable for this Report, and for the opinions maintained therein.

The principal points to which my attention has been directed in drawing up this Report, have been the cause of the cessation of the circulation in, and the treatment of, asphyxia.

There are few subjects in the whole range of the medical sciences about which more controversy has arisen, in which many of the most distinguished physiologists have taken an active part, than the immediate cause of death, and the order of the cessation of the vital actions in asphyxia. This is not to be wondered at when we reflect upon the intimate connection that exists between the respiration, the heart's action, and the functions of the nervous centres in man and the higher classes of animals; and how beset with innumerable difficulties, and how liable to error any experimental inquiry must be in which we endeavour to study the pathology of functions, individually and singly, that are naturally closely linked together, and intimately dependent upon one another. As Dr Carpenter very justly observes, "When any link in the chain of the vital phenomena is broken, and the equilibrium of the whole disturbed, the derangements that ensue are so various and complicated that it is exceedingly difficult to assign to each its peculiar agency in finally producing the fatal termination." When we consider that the subject of asphyxia has engaged the attention of physiologists since the time of Haller, the progress that has been made in it has been but very slow, each succeeding inquirer having only gradually cleared away those sources of fallacy that caused a wrong explanation to be given of the facts that had been established by his predecessors. And it is only by insulating carefully the different phenomena that present themselves, and by studying them singly, or, if this cannot be accomplished with due attention to those modifying circumstances that it is impossible to remove, that a correct knowledge can be obtained of this complicated subject. We will first proceed to examine in detail the principal doctrines that have at various times been promulgated respecting the cessation of the circulation in asphyxia.

These may be arranged under the three following heads:—*

1st, That the circulation ceases in consequence of the arrest of the respiratory movements.

2d, In consequence of want of power in the heart.

3d, In consequence of an obstruction in the passage of the blood through the capillaries of the lungs.

1. The doctrine, that the cessation of the circulation was due to the arrest of the respiratory movements, was entertained by the great Haller, who supposed that the pulmonic capillaries being

* I would refer those who would wish to pursue the history of this subject more in detail, to Dr Kay's very valuable Treatise on Asphyxia, or to the very lucid article by Dr Carpenter on the same subject in the third volume of the Library of Practical Medicine.

compressed by the collapse of the lungs, the circulation through them was arrested. This opinion was disputed by Goodwyn, who proved that the circulation continues through a lung that is compressed by the effusion of fluid into the chest. It may also be shown to be, at all events, not the sole agent in the cessation of the circulation, by the fact of an animal being readily asphyxiated when made to breathe nitrogen, or whose lungs are kept distended with vitiated air.

It must be borne in mind, however, that these experiments merely prove that the arrest of the respiratory movements is not the only cause in bringing the circulation to a stand, and not that it is without any influence in this respect.

But although Haller's doctrine is not of itself sufficient to account for the arrest of the circulation, yet I am inclined to think that the cessation of the respiratory movements have, independently of any other cause, some influence, although perhaps not a very powerful one, in occasioning this phenomenon. I am the more inclined to this opinion, as I have frequently observed that when a pulmonary vein is punctured, whilst artificial respiration is being kept up, the flow of blood from the puncture is evidently increased during the distension of the lung; and indeed, when the circulation has become much enfeebled, it ceases entirely during the collapse of that organ.

The experiments by which Dr Alison endeavours to prove that the stagnation of the blood in the lungs is due solely to the cessation of the changes between it and the atmospheric air in the pulmonic capillaries, and not to the arrest of the mechanical movements of the chest, do not appear to me to be altogether conclusive. This eminent physiologist confined a rabbit in nitrogen gas until its respiratory movements became laboured and insensibility was approaching. The animal was then withdrawn as rapidly as possible, and the brain having been suddenly crushed by the blow of a hammer, the chest was laid open. As the quantity of blood found in the right side of the heart preponderated considerably over that in the left, and as the respiratory movements had not been interrupted until the animal was deprived of life, this experiment was looked upon as conclusive evidence of the fact, that the accumulation of the blood in the right side of the heart was owing, not to the arrest of these movements, but to a cessation of the chemical changes between the blood and the air.

This conclusion appears to me not to be altogether warranted by the facts of the case; for it must be remembered that, in this experiment, the circulation continues after the cessation of the respiratory movements. When an animal that has been breathing atmospheric air up to the moment of its death, is killed by a violent blow upon the head, the sensorial functions are im-

mediately annihilated and the respiratory movements are arrested ; but the heart continues still to beat, and black blood to circulate, as in ordinary cases of asphyxia, for some time after the extinction of animal life ; the cessation of the action of that organ only ensuing in consequence of the diminution in the quantity and the alteration in the quality of the blood with which it is supplied ; and after death the ordinary appearances of asphyxia present themselves, though the chemical changes have continued as long as the respiratory movements. The following is, according to Bichat, the order of the cessation of the vital actions in severe injuries of the brain, as when that organ is crushed :—1. Interruption of the cerebral action ; 2. Annihilation of the action of all the muscles of animal life ; 3. Consequent cessation of the respiratory movements ; 4. Suspension of the chemical changes, and consequently of the coloration of the blood ; 5. Permeation of fibres of the heart with black blood ; 6. Weakening and cessation of the action of these fibres.* Now, in Dr Alison's experiment, supposing that the chest were laid open and the heart exposed as rapidly as possible after the death of the animal, at the very least a minute or a minute and a half must have elapsed, after the cessation of the respiratory movements, before this could be accomplished, during which the heart would be acting strongly ; and sufficient time would elapse for the circulation to make at least one or two circuits. Blood would consequently, as in all cases of asphyxia, from whatever cause, accumulate in the right cavities of the heart.

As an accumulation of blood in these cavities is therefore a necessary result of the sudden annihilation of the functions of the brain, in consequence of the suspension of the respiratory movements or of the chemical changes in the lungs—one or both—when the animal has, up to the moment of its death, been breathing atmospheric air, the same phenomenon ought not, I think, to be adduced as an effect of the cessation of the chemical changes alone, where it is met with in an animal that is killed whilst breathing nitrogen,—there being no evidence that it existed before the death of the animal, and that it did not result from the continuance of the circulation after the cessation of the respiratory movements.

It was thought that the relative influence of the arrest of the respiratory movements, and of the cessation of the chemical changes in occasioning an accumulation of blood in the cavities of the heart, might be more accurately determined by keeping up the movements of respiration, not only until after these changes had been arrested, but until the pulsations of the heart and the circulation of the blood had entirely ceased. The difference in the

* *Recherches Physiologiques*, p. 320.

proportional quantity of blood contained in the two sides of the heart in this, and in ordinary cases of asphyxia, being the measure of the relative influence of the cessation of the chemical changes, and of the arrest of the respiratory movements. The following experiment was accordingly performed :—

Exp. 1. A tube having been introduced into the trachea of a small black terrier, a syringe capable of holding eight ounces, and filled with air, was attached to it. The piston was then worked in such a way that the natural movements of respiration might be imitated.

1½ minute.—Animal began to struggle.

3d minute.—All struggles ceased.

11th minute.—The chest was laid open, and the lungs found fully distended and of a darkish gray colour.

14th minute.—Heart's action ceased entirely. During the whole of this time the action of the syringe had been continued except whilst the chest was being laid open, which renders the experiment perhaps a little less conclusive than it otherwise would have been.

The heart was found much distended on both sides ; coronary arteries and veins quite black ; the pulmonary veins as well as artery, were fully distended and perfectly black. The left auricle being punctured, a large quantity of fluid black blood flowed from it and from the pulmonary veins ; the left ventricle also contained a considerable quantity of black fluid blood ; the right cavities contained a large quantity. The difference, however, in the quantities contained in the opposite sides of the heart was not by any means so great as usual ; the left side containing comparatively much more blood than in ordinary cases of asphyxia ; indeed, very nearly as much as was found in the right cavities. This experiment I have repeated several times with the same result, the quantity of the blood in the left cavities being invariably greater than in those cases of asphyxia in which the respiratory movements have, from the first, been arrested. This is in accordance with the observations of Kite and of Coleman, who found that when the lungs were kept mechanically distended during the process of asphyxia, the left cavities of the heart contained comparatively more blood than the right ; in some cases the quantities in the two opposite sides of this organ differing very little, if at all.

From these experiments, then, I think that we may conclude that the persistence of the respiratory movements has some influence in maintaining the circulation through the lungs, but that their arrest is not by any means the sole cause of the cessation of the circulation.

2. We will now proceed to the consideration of the second class of opinions, namely, that the circulation ceases in asphyxia

in consequence of a want of power in the heart. This cause, which was much insisted upon by the earlier writers, appears to me to have had scarcely sufficient attention paid to it by several modern physiologists; more especially in estimating the influence of an obstructing cause in the capillaries on the cessation of the circulation.

It will be unnecessary to do more than allude to the opinion of Goodwyn, that the circulation was arrested and the heart's action brought to a stand in consequence of the venous blood being an insufficient stimulus to the left cavities of that organ, as this doctrine received a complete refutation from Bichat, who found that the injection of venous blood into the left cavities will stimulate them when their action is much depressed; and that blood of a perfectly venous character circulates for some time through the pulmonic and systemic capillaries before the heart's action ceases. In hibernating animals, also, blood that is nearly of a venous character circulates without difficulty. Besides, were Goodwyn's views correct, the left cavities of the heart and the pulmonary veins ought to be found after death distended with blood, which is not the case.

The opinions of Bichat on this part of our subject are of the highest interest and importance. This physiologist supposed, as is well known, that the cause of the cessation of the circulation in asphyxia was that venous blood penetrated into the tissue of the heart, weakening each individual fibre; and he states that he is convinced that if black blood could be made to circulate through the coronary artery, whilst arterial blood passes as usual through the cavities of the heart, that the action of that organ would cease as rapidly as when venous blood only penetrates into its tissue by the coronary arteries, after having passed through the left cavities of that organ. Thus, he says, it is only little by little, and after it has thoroughly penetrated into each individual fibre, that the action of this organ is lessened, and at last ceases; in the other case, (according to Goodwyn's view,) a sudden cessation of the heart's action ought to ensue. It would appear that Bichat did not believe that venous blood was actually deleterious to muscular contractility, but rather that it acted by the exclusion of arterial blood. He says, "*le cœur cesse d'agir lorsque les phenomenes chimiques du poumon sont interrompus parceque le sang noir qui penetre ses fibres charnues n'est pas propre à entretenir leur action.*" He did not, however, regard the enfeebled condition of the heart as the sole cause of the cessation of the circulation in asphyxia. This he attributed likewise to an increase in the mass of the blood, owing to a retention in it of excrementitious matters, which in a healthy condition pass off by the different secreting organs. He also thought that there was a tendency to the ob-

struction of the blood in its passage through the tissue of the lungs in consequence of a want of due stimulation of that organ by red blood; the black blood circulating through the bronchial arteries producing the same effect upon the lungs as it does when it penetrates the tissue of the heart. Another cause which embarrasses the circulation through the lungs, when the chemical changes cease, is according to Bichat, the absence of the stimulus of the vital air upon the mucous membrane of the air cells, by which he supposed the capillary circulation to be, in a normal condition of that organ, partly maintained; and lastly, as far as the heart is concerned, the cause that gives rise to the stagnation of the blood is the enfeebled condition of the right auricle and ventricle, which being permeated by the black blood, are no longer capable of impelling this fluid with sufficient energy towards the lungs, and consequently of overcoming the resistance that it meets with there.

I have been thus particular in giving a résumé of the opinions of Bichat on asphyxia, as they cannot, I conceive, be too attentively studied by any one who wishes to make himself acquainted with the pathology of this disease.

It is almost needless to adduce any formal experimental evidence in proof of the fact, that the force of the contractions of the heart is weakened in asphyxia; but it may not be altogether uninteresting to inquire how this debility is occasioned.

The influence of arterial blood in maintaining the contractility of the voluntary muscles has long been recognized both by physiologists and surgeons. Stenson, Emmert, Bichat, and Segalas, have proved by direct experiment upon animals, that on ligaturing the larger arterial trunks, the limbs from which the supply was thus cut off were found to be much weakened and indeed paralysed in their muscular power. It is also a fact familiar to all practical surgeons, that, after the ligature of the main artery of a limb, as the femoral or axillary, for instance, voluntary motion will be lost in the part which is thus deprived of its blood; and in these cases it is often many weeks before the power of moving the extremity is regained. That the same is the case in the heart I have already attempted to show by some experiments, the details of which were read before the British Association in 1842, and which were published in the *Medical Gazette* of the same year. From these it would appear, 1st, That the arrest of the coronary circulation produces a speedy cessation of the heart's action, though respiration be actively carried on; and, 2d, That the presence of venous blood in the fibres of the heart serves to maintain the contractions of that organ for a longer period than when its tissue is entirely deprived of blood. Dr Kay had previously, satisfactorily, and incontestably ascertained that the contractile power of muscles, involuntary as well as volun-

tary, is supported through a comparatively longer period when their fibres are congested even with venous blood, than when emptied of that fluid; but that, nevertheless, dark blood is less favourable than arterial to the contractility of muscle. Now in asphyxia we have both causes, a diminution in the quantity, and an alteration in the quality of the blood, in operation; the blood that reaches the left cavities, and that is consequently propelled into the coronary arteries, being, after a time, much diminished in quantity, and being also deprived of its normal stimulating qualities by its conversion into venous. Indeed, on referring to the very interesting experiments of Dr Reid, on the obstruction that takes place in the systemic capillaries in asphyxia, it will be found that the maximum of the pressure, and consequently of the force of the heart's contractions, is at about the second minute after the closure of the trachea, and that, after that, the pressure gradually falls, although the obstruction continues the same. This is in accordance with what I have likewise observed on repeating and modifying these experiments.

I cannot, however, agree with Dr Kay as to the length of time that the heart will continue to contract after the circulation has ceased. He says, "that it contracts long after blood has ceased to flow from the coronary veins;" and again, "its contractions survive the period when it is possible that the coronary arteries can receive the asphyxial blood."

I think that it may fairly be questioned whether this is the case; whether the contractions of the heart continue at all after the circulation through the coronary vessels has ceased. And not only through the coronary, but also through the pulmonary vessels. For it must be borne in mind, that the left cavities of the heart are never found empty in asphyxia; that although not distended, as the right auricle and ventricle are, yet that they are frequently in this disease found to be tolerably full of blood. Coleman states that the relative quantities of blood in the two sides of the heart varies considerably, but that on an average the quantity in the right is to that in the left as $3\frac{2}{3}$ th to $1\frac{1}{2}$ th, or as about $3\frac{2}{3}$ ds to 2. Now such a large quantity of blood as this, amounting to nearly two-thirds of that in the right cavities, can certainly not be supposed to accumulate in the left side of the heart if the contractions of that organ continue long after the circulation has been brought to a stand. On the contrary, it would lead to the opposite inference, or, at all events, prove that the stoppage of the circulation could not have occurred before the cessation of the heart's action. And this I believe to be the case that the circulation is not entirely arrested until the heart has ceased to beat.

On taking the average of nearly twenty experiments on asphyxia, in which the time that the contractions of the heart continued

after the trachea had been closed was noted, I find that the contractions of the ventricles last for about nine and a quarter minutes, and that the pulsations in the femoral artery are perceptible on an average for about seven and a half minutes after all access of air to the lungs has been prevented. Now Bichat states that the blood in the arteries becomes as dark as that in the veins in from a minute and a half to two minutes, which statement is confirmed by Dr Reid, and the accuracy of which I have had frequent occasion to remark; the left ventricle will therefore continue to propel perfectly venous blood for at least six or seven minutes, with a sufficient degree of force to occasion a pulsation in the femoral artery, and *a fortiori* therefore into the coronary artery. Supposing that the circulation through this vessel ceases entirely when the pulse can no longer be felt in the femoral artery, the heart would only contract for at most two minutes after the passage of the blood through the coronary vessels had ceased. But it is extremely probable that although the contractions of the heart have become so feeble after about the seventh or eighth minute as not to be able to propel blood into the femoral artery, yet that they may still continue to do so in a small and enfeebled stream certainly, but still to a certain extent into the coronary arteries; from which I have never failed to procure blood by puncture as long as the heart's action continues. It must, moreover, be borne in mind that there is never a complete obstruction in the capillaries of the lungs, a certain quantity of blood finding its way into the left cavities of the heart until the very last, as these are never found perfectly empty after death by asphyxia, but most generally, indeed, contain a tolerably large quantity of blood. So that the blood is present, provided the contractions of the heart are not so excessively enfeebled as to be unable to propel it into the coronary arteries, which cannot require much force; indeed, if the blood be merely ejected, or trickle out of the ventricle, it will find its way into these vessels, as is proved by the fact, that when artificial respiration is set up after all ventricular action has ceased, the coronary arteries, which had previously been quite black, are seen to acquire a florid hue, without any ventricular contractions having taken place, but solely in consequence of the draining of a certain quantity of the aerated blood into these vessels from the left ventricle, showing with what ease nature intends the blood to pass into the coronary arteries.

Another very interesting and important fact connected with the action of the heart in asphyxia is the great diminution in the frequency of its pulsations, as soon as the blood in the arteries has become perfectly black. This fact has been noticed by Dr Reid, though in reference to another point in the pathology of the disease. There is less occasion, therefore, to give a detail of the results of the observations that I have made upon it, though it may

be as well, for the sake of illustration, to mention the details of two of the cases in which I noted them.

Exp. 2. The animal was asphyxiated by having the stop-cock of a pipe that had been fixed in his trachea shut, and the pulsations were noted on the femoral artery, which had previously been exposed, as in Dr Reid's cases. In the first experiment the heart was acting tumultuously, at least 130 in a minute; at the end of the first half minute after the stop-cock was turned it had fallen to 104—108; whilst the animal was struggling during the next two minutes it rose again in frequency, but could not be counted owing to its tumultuous action; at the end of the third minute it had fallen to 48—52, at which time the animal was perfectly quiet and quite insensible; it gradually fell, until, at the end of the fifth minute, it was 36—40, and rather irregular; at the sixth minute it had fallen to 28; at the seventh minute it was about the same, but much weaker and more irregular; and before the eighth minute it had ceased to be perceptible.

Exp. 3. In the next experiment the pulse was at the time of the closure of the stop-cock 100—104, pretty regular; at the end of the first minute, when the animal was struggling violently it had risen considerably, to at least 130 or 140, but could not be counted with certainty, owing to its tumultuous and irregular action; at the end of two and a half minutes it had fallen to 68—72, at which time the animal was perfectly quiet, and the blood as black as in the accompanying vein; at the end of the third minute it had fallen to 60—64. The pipe in the trachea was then opened, and on air being admitted to the lungs, it immediately rose to 76—80, showing the influence that the aëration of the blood has in immediately restoring the frequency of the heart's contractions. The effect that it has in restoring their power is evident from Dr Reid's experiments, in which the mercury rose from 6 to 11 inches when a bladder of atmospheric air was applied to the trachea.

These observations, which it is needless to multiply, prove that the frequency of the heart's contractions is diminished by from one-third to one-half when perfectly venous blood is circulating through its vessels. The rapidity of the circulation, and the propulsive force exercised by the heart during a given time, must therefore, *cæteris paribus*, be proportionately lessened.

It was thought that additional light might be thrown upon this part of our subject by observing the phenomena of asphyxia in those young mammals, which have the eyes closed for some time after birth, and in which the *foramen ovale* and *ductus arteriosus* are still open; it being evident that in these animals death could not occur from obstruction of the pulmonary circulation, the two sides of the heart communicating in another and more direct way than through the pulmonary vessels.

The very interesting experiments of Buffon, Legallois, and Edwards, on the period that young warm-blooded animals will live when deprived of air, are so well known as not to require more on our part than a passing reference. Legallois found that the power that some young mammals possess of enduring a deprivation of air rapidly diminishes as the age of the animal increases; and Edwards pointed out the fact, that the duration of life, when animals are deprived of air, is chiefly influenced by two circumstances, namely, their power of generating animal heat, and the external temperature to which they are exposed. In young puppies, shortly after birth, the quantity of blood that passes through the lungs, and that consequently becomes arterialized, whilst the *foramen ovale* and *ductus arteriosus* remain open, is but very small. This no doubt increases day by day until these passages are closed up, the vital condition of the animal becoming such as gradually to necessitate the arterialization of a larger quantity of blood. But yet limited though the quantity of arterialized blood, during the earlier period of existence, may be, yet the complete deprivation of that fluid is incompatible with life, the animal being as certainly, though not as quickly, destroyed on the exclusion of atmospheric air as an older one is.

Exp. 4. A puppy, four days old, was strangled. Struggles ceased in nine minutes. The thorax was then laid open, and the heart exposed; the blood that flowed from the cut mammary and intercostal arteries was perfectly black. At the expiration of an hour and twenty minutes the ventricles had ceased to act; the auricles continued to act for nearly three hours and a half.

On examination about two hours after the action of the heart had ceased, it was found that the right cavities and pulmonary artery were full of black blood, but by no means distended,—certainly not containing so much as in older animals that have been asphyxiated. The left cavities also contained a considerable quantity of black blood, but not quite so much as the right side did; there was likewise some in the aorta. The *ductus arteriosus* and *foramen ovale* were quite pervious. The lungs were apparently but slightly congested.

Exp. 5. Another puppy of the same age was strangled; the spasmodic movements continued for sixteen minutes; the chest was examined four hours after the trachea had been tied. All movement of the heart had then ceased, and the same appearances, as nearly as possible, were found as in the former case,—the difference in the quantity of blood on the two sides of the heart being but small. The same experiment repeated on other puppies of the same age was attended with similar results.

In the asphyxia of very young animals it is quite evident, as has already been stated, that the circulation cannot be brought to

a stand in consequence of any obstruction to the passage of the blood through the pulmonary capillaries, as the *ductus arteriosus* and *foramen ovale* are still patent. This is also proved by the fact of both sides of the heart containing nearly an equal quantity of black blood. The cause of death must consequently be sought for in the heart ; which organ continues acting until its irritability, which (like that of the muscular system generally in young warm-blooded animals with closed eyes) is very great, is exhausted by the continued circulation of black blood through its muscular fibres. For however low the vitality of a young puppy may be, yet the process of respiration is carried on to a certain extent, it being necessary, as has already been stated, for the maintenance of life, that a certain quantity of arterial blood should circulate through the system. When this supply, comparatively trifling as it may be, is cut off, the blood becoming entirely venous, is rendered unfit for the supply of the wants of the system ; for although, as Edwards and Dr Kay have shown, venous blood may for a time keep up the contractility of the heart and other muscles, yet it is of course unable to do so for a continuance.

The principal cause of the cessation of the circulation, then, in young warm-blooded animals born with the eyes closed, whilst the *ductus arteriosus* and *foramen ovale* remain open, appears to be the gradual diminution in the force of the heart's contractions in consequence of the circulation of black blood through its muscular fibre.

The following are the phenomena, then, of the cessation of the heart's action in asphyxia : When the access of atmospheric air is prevented, the blood continues to be supplied for a minute or two, apparently in its usual quantity, by the pulmonary veins, and the contractions of the heart are as strong, and usually more frequent than natural. At about the second or third minute, when the blood has become perfectly venous in its characters, the frequency of the contractions falls very considerably, and the force of the propulsive power probably begins to be impaired. The alteration in the quality of the blood continuing, and the diminution in its quantity increasing, owing to causes that will presently be adverted to, the contractions of the ventricles become gradually weaker and weaker, as well as less frequent, and at about the ninth or tenth minute cease entirely ; tremulous movements continuing in them, however, without distinct contractions, for some little time longer.

3. We now come to the consideration of the third class of opinions, viz. that the cessation of the circulation arises principally or entirely from an obstruction to the passage of the blood through the capillaries of the lungs. About the evidence of such an obstructive force there can no longer be any doubt ; but the manner in which it is occasioned is still a *quæstio vexata* amongst physiologists.

That some degree of obstruction takes place in the capillaries of the lungs there can be no doubt. There is sufficient evidence of this in the congested condition of the lung, in the tension of the pulmonary artery, and in the accumulation of blood in the right cavities of the heart, as compared to the state of the pulmonary veins, and of the left auricle and ventricle.

The recent experiments of Dr Reid (*Edin. Med. and Surg. Journ.* Vol. lv.) have established the important fact, that the circulation is obstructed in the systemic as well as in the pulmonic capillaries, causing an increased pressure on the walls of the arteries, as ascertained by the hæmadynamometer, whilst a similar instrument, when introduced into a vein, exhibits a proportionate diminution of the pressure in that class of vessels. From this it is evident that in asphyxia there exists an occasional impediment to the passage of the blood from the arteries into the veins.

I must confess, that on perusing the results of Dr Reid's experiments, and on repeating these on animals, I was at first inclined to attribute this retardation in the passage of the blood through the systemic capillaries, simply to the effect of the compression of these vessels, and the consequent concentration of the heart's force in the arterial system, by the violent struggles and efforts at expiration of an animal that is being asphyxiated. This opinion was strengthened on looking over the table of the details of one of these experiments, in which it will be found that the greatest range in the mercury occurs whilst the animal is struggling violently. I have several times seen the mercury in a hæmadynamometer that has been fixed in the carotid artery of a dog, oscillate between four and eight inches if the animal struggled or expired forcibly, although the respiration was free and unimpeded. This objection appears to have occurred to Dr Reid, as he makes, in the very interesting paper referred to, some remarks on the increased force with which the blood is sent along the arteries during violent muscular contractions, and especially during expiration. In order to satisfy myself of the influence of this cause in Dr Reid's experiments, which is of some importance in general physiology, as well as in its bearings on the pathology of asphyxia, I determined to ascertain whether the pressure in the arteries is increased during the progress of asphyxia in an animal in which no muscular movements can take place; and if it were increased, to what extent. By ascertaining this, the pressure that is due to the muscular movements of the animal may be separated from that which is dependent upon an obstruction in the capillaries from some other cause. I accordingly performed the following experiment,

Exp. 6. A pipe with a stop-cock attached was introduced into the trachea, and a hæmadynamometer was adapted to the carotid

artery of a middle-sized dog. The animal was then pithed, and artificial respiration was immediately set up. The mercury in the hæmadynamometer stood at $3\frac{1}{4}$ to 4 inches, and the heart was beating 80—84 in a minute. On discontinuing the artificial respiration, which was done as soon as the pressure in the arterial system had been ascertained, the mercury in the hæmadynamometer remained at the above level for about half a minute; it then began to rise, and by the end of the first minute stood at $5\frac{1}{2}$ to $6\frac{1}{2}$ inches, at which point it continued for about two minutes, when it gradually began to fall in consequence of the failure of the heart's action, which ceased entirely at the ninth minute.

Exp. 7. In another experiment of the same kind, after the animal had been pithed and artificial respiration set up, the mercury in the hæmadynamometer stood at $3\frac{1}{4}$ inches, oscillating between that point and $4\frac{1}{4}$ inches. On discontinuing the inflation, which was done as soon as the pressure had been taken, the mercury remained stationary for about a quarter of a minute; it then gradually rose, and at the end of the first minute stood at $5\frac{1}{2}$ and 6 inches, occasionally rising to $6\frac{1}{2}$ and $6\frac{3}{4}$ inches; it stood at this height for a minute and three-quarters, when it gradually and slowly began to sink, and at the eighth minute, when the ventricles ceased to beat, stood at a level.

Exp. 8. I performed the same experiment a third time with a like result, the mercury rising steadily, soon after inflation was discontinued, for 2 or $2\frac{1}{4}$ inches, and maintaining this level for about two minutes, when it gradually and slowly began to sink, in consequence of the failure of the heart's action, which gradually became weaker and weaker, and ceased entirely before the tenth minute. These experiments fully confirm those that have already been published by Dr Reid, and serve to establish the fact that the blood, when it has become venous, is retarded in its progress through the systemic vessels. They differ, however, from the results obtained by this gentleman in one important particular, namely, the much smaller rise in the mercury, and the consequently smaller amount of pressure in the arterial system, which I am at a loss to account for in any other way than by attributing it to the total absence of one cause of obstruction,—muscular contraction. It is true that the operation of pithing may, like the sudden destruction of the brain, weaken the force of the heart's action, and this may account in some measure for the absolute rise of the mercury in the hæmadynamometer not being in my experiments somewhat greater than it was, but it cannot be the sole cause; for the increase of pressure after the blood had become venous was, relatively to what it was whilst inflation was being performed, smaller in my experiments than in Dr Reid's; amounting only to from 2 to $2\frac{1}{4}$ inches of mercury, or to about a

pound to a pound and a quarter on the square inch ; which was maintained until the heart's action became enfeebled from the want of its proper stimulus, when the circulation was gradually brought to a stand throughout the body. The relative difference, then, in these two sets of experiments in the height of the mercury before and after the blood became venous, can only, I think, be accounted for by the absence in one of them of the obstructive influence of muscular contraction.

I think it probable that the retardation must occur in the pulmonic vessels before it does in the systemic ones, as we should otherwise find it difficult to account for the accumulation of blood that is invariably found to take place in the venous system in asphyxia. That the retardation of the blood should commence, and perhaps be more complete, in the pulmonic than in the systemic vessels, is nothing more than we should expect, as those vessels are more immediately and directly influenced in the process of asphyxia than those of any other organ or part of the body.

The next question, how this obstruction is occasioned, is the most important of all that present themselves in this inquiry, and its solution is a matter of some moment to physiological science.

There are at present three modes of accounting for this phenomenon, each of which can boast of distinguished supporters. They are as follows :—

1st, That the cessation of the circulation through the capillaries of the lungs is the result of a sort of paralysis of these vessels, occasioned by the deleterious action which the venous blood exercises on the nervous centres in its circulation through them, whereby the “nervous influence” that is necessary for the flow of blood through the lungs is destroyed.

2dly, That the stagnation of the blood in the lungs is the result of the cessation of the vital attractions connected with the chemical changes between the air and the blood during the process of respiration.

3dly, That, in consequence of the non-arterialization of the blood, the minute pulmonary vessels which usually convey arterial become incapable of transmitting venous blood, which consequently stagnates in the lungs.

a. We will first of all proceed to the consideration of the doctrine, that the cessation of the circulation in the capillaries of the lungs is the result of a sort of paralysis or loss of tone of these vessels, occasioned by the deleterious action which the venous blood exercises on the nervous centres by its circulation through them, whereby the “nervous influence” that is necessary to the flow of blood through the lungs is destroyed. That the non-arterialized blood flows freely through the vessels of the lungs into the left side of the heart, whence it is propelled into the general

circulation, until its deleterious influence has so enfeebled the actions of the nervous centres that the capillaries of the lungs become unable to transmit the blood that is propelled into them from the right side of the heart. Now it is certainly an incontestable fact that the actions of the brain and *medulla oblongata* become gradually more and more enfeebled during the progress of asphyxia, but that the cessation of the actions in these parts is the cause of the arrestment of the circulation through the lungs is not so evident.

It would be out of place here, and would lead us too far away from our present subject, to inquire into the evidence on which the doctrine of the dependence of the capillary circulation on nervous influence rests; but, as Dr Carpenter remarks, "The doctrine that nervous influence is essential to the flow of blood through the capillaries of the lungs or of any other part is a mere assumption unsupported by physiological facts." The principal objections that bear against this explanation are, that the circulation through the lungs may, as will hereafter be more fully shown, after it has been brought to a stand, be excited by a cause that acts primarily and directly upon the capillaries of these organs, and that can excite no influence upon the blood contained in the vessels of the brain or *medulla oblongata*, namely, artificial respiration. By which means also the circulation may easily be kept up for a considerable length of time through the lungs after all influence of the nervous centres has been entirely removed, as when the animal has been pithed. It is, moreover, opposed by the pathological fact, that a considerable degree of congestion may exist in the pulmonary vessels, before the blood is sufficiently carbonized to give rise to any diminution in the activity of the functions of the nervous centres.

As the doctrine under consideration is, as I understand, entertained by several physiologists in this country, to whose opinions much deference is due, and as it is of much importance in a practical as well as of interest in a scientific point of view, to ascertain its correctness, I determined, in order to do this, to put it to the test of experiment in such a way that arterial blood might be made to circulate through the brain and *medulla oblongata* of a dog after all access of air to the lungs had been prevented by the closure of his trachea. In which case the stagnation of the blood in the pulmonic capillaries ought not to occur if it were dependent upon the want of proper nervous influence being communicated to these vessels; the brain and nervous centres being properly stimulated by arterial blood.

Exp. 9. Three mongrel terriers, A, B, and C, were properly secured in such a way that their heads might be brought into close apposition. A tube, furnished with a stop-cock, was then introduced

into the proximal end of the left carotid artery of A, and another into that of the right carotid artery of C. These vessels had previously been ligatured beyond the point at which the pipes were introduced so that no hæmorrhage might occur. The force of the heart's impulse, in the lateral dogs, A and C, was now measured by the hæmadynamometer, and found to amount to from $4\frac{1}{2}$ to 5 inches in each of them. A tube, furnished with a stop-cock, was next adapted to the trachea of the centre dog, B, and a pipe was introduced into the distal extremities of both its carotid arteries, which were tied below the point at which the pipes were inserted. The animal did not appear in the least to suffer from the ligature of both these arteries. One of the jugular veins of the centre dog was then exposed, and a ligature was passed under it in order that it might be punctured, so as to avoid the occurrence of plethora and apoplexy, when the carotid arteries of the two lateral dogs were connected with the corresponding vessels of the central one. The pipes in the carotid artery of A and C were then adapted by means of connecting pieces to those in the central dog, and were besides tightly tied together, so that they could not slip during the struggles of the animal. When this arrangement had been properly and securely made, the trachea of the centre dog was closed, the jugular vein was punctured, and the stop-cocks connecting its carotid arteries with those of the lateral dogs were opened. As soon as this had been done the vertebrals of the dog, B, (the centre one), were compressed with the fingers of an assistant, in order that the circulation through the brain might be confined as nearly as possible to arterial blood. The centre dog remained quiet for about a minute and a quarter; it then began to struggle, and in three minutes all movement had ceased, and animal life was extinct. The distal extremities of the carotid arteries of the centre dog were then examined, as they had been several times during the experiment, and were found still to pulsate, although somewhat feebly, from the impulse of the blood sent direct from the hearts of the lateral dogs. Nearly a pint of blood had flowed from the jugular vein during the experiment, so that the animal had clearly not died from plethora. The lateral dogs were both alive, but evidently enfeebled by loss of blood; and on the pressure in the carotid artery of one of them being measured by the hæmadynamometer, it was found to amount to not more than 3 or $3\frac{1}{2}$ inches of mercury.

The centre dog was opened about ten minutes after its death, by which time the action of the heart had entirely ceased. The lungs were of a gray mottled colour, and much congested, dark drops of blood exuding when they were cut into. The coronary vessels were quite black; the right auricle and ventricle and pulmonary artery were distended with black blood. The *venæ cavæ*

and liver were also much engorged. The pulmonary veins, and the left auricle and ventricle, also contained some black blood; the aorta was nearly empty, being merely moistened with a little blood.

In this experiment every possible precaution was taken to avoid those sources of fallacy that were likely to occur, and it was found that the animal died as quickly after the closure of the trachea, when arterial blood was circulating through the brain and *medulla oblongata*, as when these parts were, as in ordinary cases of asphyxia, permeated with venous blood.

The principal source of error in an experiment of this kind would necessarily arise from the supervention of apoplexy in the central dog, in consequence of its vessels becoming inordinately distended by the quantity of blood sent directly into them from the hearts of the two lateral ones, which accident actually occurred, (as Dr Kay has pointed out,) in a somewhat similar experiment performed by Bichat. The supervention of this accident was, however, guarded against in the present instance, by puncturing the jugular vein of the centre dog, before the stop-cocks were opened, and the blood began to flow into its carotids; and the utility of this precaution may be judged of by the fact, that nearly a pound of blood escaped by the puncture thus made, and which was doubtless almost entirely furnished by the lateral dogs. For when the pressure in the carotid artery of one of these was measured after the conclusion of the experiment, it was found that the column of mercury in the hæmadynamometer stood one and a-half inch lower than before the commencement of the experiment, showing clearly that the animal had suffered much from hæmorrhage.

That the centre dog did not die of hæmorrhage from the jugular vein was evident from the results of the *post mortem* examination.

It may be objected to this experiment that the venous blood conveyed by the vertebral arteries to the brain of the dog that was asphyxiated might have been sufficient of itself to suspend the nervous influence. But this could not have been the case; for during the experiment the vertebrae were compressed in such a way as to confine the cerebral circulation as much as possible to arterial blood. And even if this were not accomplished in a very perfect manner, yet the quantity of venous blood transmitted to the brain and *medulla oblongata* would not exceed that of the arterial transmitted by the carotids; and this mixed fluid would contain fully sufficient red blood to support the nervous influence in a diminished degree perhaps, but still to such an extent as to retard very considerably the progress of the asphyxia, which did not happen; the usual phenomena of that condition presenting themselves in the exact order and at about the average time at

which I have found them to occur in the other experiments that I have performed on this subject, and not being retarded in any very appreciable manner.

It is true that an opposite experiment to this has been performed by Bichat, the results of which might appear to be irreconcilable with those of the one just related; but a brief examination will, I think, convince us that this difference is rather apparent than real. I allude to the experiment in which that eminent physiologist found, that when the carotid arteries of two dogs were united by means of a canula, so that the heart of one might be made to propel blood into the brain of the other, if the dog that was propelling the blood were asphyxiated, the one through whose brain the venous blood circulated became confused, agitated, and lost the use of its external senses, and, if the experiment were continued, would die. More rapid and marked results were found to ensue when venous blood was injected into the carotid artery by means of a syringe. Dr Kay has, however, clearly and incontestably proved that the deleterious effects manifested in the first of these experiments are attributable to the receiving dog becoming plethoric; that the effects, which were slow in manifesting themselves, resemble those that follow too large an injection of blood into the veins of an animal; and that the very rapid death of the animal, when venous blood was thrown in by means of a syringe, was due to the injury that the texture of the brain received from the force employed.

I do not, however, wish it to be understood from the remarks that I have just made, that I deny the possibility of an animal being readily and speedily asphyxiated by the circulation of venous blood through the brain and *medulla oblongata*. But this would be in consequence of the suspension of the function of these parts breaking one of the links in that chain of vital actions, the integrity of which is necessary for the due maintenance of the respiratory movements, the imperfect performance of which would necessarily occasion an interruption to the chemical changes between the blood and the air in the lungs; on the cessation of which asphyxia must necessarily ensue. I think, then, from the experiment that has just been related, as well as from the arguments that have been adduced, we may conclude that the usual phenomena of asphyxia occur when the access of air to the lungs is prevented, whether the "nervous influence" be maintained or not.

β. We will now proceed to the examination of the opinion that is entertained by Dr Alison and others, namely, that the blood stagnates in the lungs in asphyxia, in consequence of the cessation of the vital attractions connected with the chemical changes that take place between the blood and the air in the lungs.

It will not be necessary for us to enter upon the general question of the dependence, in whole or in part, of the capillary circulation on the persistence of the vital attractions and repulsions between the blood and these vessels,—a doctrine which, as is well known, is advocated by several physiologists whose opinions are entitled to much weight, but merely to discuss this doctrine in its bearings on the subject of the present inquiry*.

Although there can be no doubt that the smaller vessels possess a distributive power over the blood, one by which they can modify the flow of blood to particular parts independently of the action of the heart, yet I do not think that we are warranted in supposing that any vital actions going on between the blood and these vessels can exercise a propulsive influence upon that fluid.

The following experiments, performed by Dr Sharpey, clearly prove that the force of the heart's contractions are of themselves fully sufficient for carrying on the circulation without the necessity of assuming the operation of minor causes.† A syringe having a hæmodynamometer attached was adapted to the thoracic portion of the aorta of a recently killed dog, which vessel had previously been ligatured immediately above the renal arteries, and the *vena cava inferior* was opened where it passes through the diaphragm. Beat bullock's blood was then injected and passed out of the *vena cava inferior*, after traversing the double capillary system of the intestines and liver, in a free stream with a pressure of $8\frac{1}{2}$ inches of mercury; when a pressure of 5 inches was used it flowed out in a full jet.

When the aorta was not ligatured above the renal arteries, but left pervious so that the blood might flow through the lower extremities, the same pressure was fully sufficient to drive the blood freely through their extensive vascular ramifications.

If the same instrument be adapted to the pulmonary artery, it will be found that a pressure of from $1\frac{1}{2}$ to 2 inches of mercury will suffice to drive beat bullock's blood through the capillaries of that organ, so that it may flow in a free stream from the left auricle or the pulmonary veins.‡

In the first two experiments just related, the force that sufficed to drive beat bullock's blood through the capillaries of the chylopoietic and portal systems was about the same as what is exercised by the left ventricle, certainly not more. In forcing the blood through the pulmonic capillaries much less power was required; proportionately probably to the strength of the impulse

* I would refer those who may wish to see this matter fully discussed, to Dr Allen Thomson's excellent Essay on the Circulation, in the Cyclopædia of Anatomy and Physiology.

† I may take this opportunity of stating, what I omitted to do on a former occasion, that these experiments were first suggested and performed by Dr Sharpey.

‡ In performing these experiments it is necessary that the bullock's blood be previously strained through a thick cloth, in order to remove any small coagula that may be present.

of the right ventricle. But as I have elsewhere remarked,* it would be exceedingly difficult, if not impossible, to prove the amount of propulsive power exerted by the right ventricle, as the experiment of attaching a hæmadynamometer to the pulmonary artery of a living animal would be attended by so many modifying circumstances, as not to admit of any conclusive result being obtained. If, however, we are allowed to assume that a muscle contracts with a power proportioned to its size, we shall, as the thickness of the walls of the right ventricle are to those of the left, according to Bouillaud, as $2\frac{1}{2}$ to 7, be allowed to estimate the power of its contractions in the same ratio. Now, as the left ventricle propels the blood in the arterial system with a pressure equal, on an average, to about five inches of mercury, if any thing, rather less, certainly not more, the ratio of the pressure exercised by the left ventricle as compared to that of the right, may be stated by the formula $7 : 2.5 :: 5 : 1.78$; which would probably be about the pressure in the pulmonary artery, and which agrees with the force required to propel bullock's blood through the vessels of the lungs, which amounts, as has already been stated, to from $1\frac{1}{2}$ to 2 inches of mercury. Although these experiments are not conclusive evidence against the existence of any motor power in the circulation besides the heart, yet as they show that the pressure exercised by that organ would of itself be fully sufficient for the purpose of carrying on the circulation, they may be considered as affording strong presumptive evidence in favour of the opinion, that the action of the heart, aided by the distributive power of the arteries, is of itself sufficient for carrying on the circulation of the blood.

But instead of arguing upon the general question of the dependence of the capillary circulation on the persistence of the vital actions connected with the chemical changes, let us inquire, whether, even were this point conceded, it would be sufficient to account for the obstruction to the passage of the blood through the capillaries in asphyxia. If the arrest of the circulation in these vessels were owing to the cessation of the chemical changes, it must necessarily follow that, when these cease, the passage of the blood must be arrested. Now this is not the case in asphyxia. The chemical changes between the blood and the air in the lungs cease, and the blood in the arterial system becomes perfectly venous in less than two minutes after the access of air has been cut off. Bichat states that the blood in the arteries assumes a perfectly venous character in from a minute and a half to two minutes, in which statement Dr J. Reid coincides. I have frequently noticed the blood in an exposed artery to be perfectly black and quite undistinguishable from venous blood in a minute and a half; and occasionally even

* Edin. Med. and Surgical Journal, January 1844.

in a somewhat less time than this ; the difference being probably owing to the quantity of residual air that happens to be in the lungs when the trachea is closed. But at all events, most writers on this disease agree, that in less than two minutes the blood is perfectly black, and we may accordingly take this as the period at which the chemical changes have ceased. The circulation of this black blood, however, continues for a very much longer time ; and not only continues, but goes on actively and forcibly. I have found the average time at which the pulsation in the femoral artery ceases to be perceptible, to be the eighth minute after the cessation of respiration ; that is to say, at least six minutes after the blood has become perfectly venous ; and it is highly probable that, although the pulsations may no longer be perceptible in an artery so far removed from the centre of the circulation as the femoral, that the blood still continues to circulate through the lungs for some time after this. Indeed this is rendered highly probable by an experiment that I shall immediately relate. The evidence of Dr Alison* on this point is very distinct. He says, " the circulation through the heart has very generally ceased within less than ten minutes from the commencement of the obstruction." In the table of one of Dr Reid's experiments on the pressure in the arterial system, it is stated, that at the sixth minute after the trachea was shut, the mercury oscillated between 3 and 6 inches, thus showing that the circulation was going on actively. From this, then, it is very evident that the circulation continues for at least from six to seven minutes, and must take place seven or eight times after the cessation of the chemical changes ; which fact appears to me to be inconsistent with the idea that the passage of the blood through the capillaries is dependent upon the vital actions connected with these changes, more particularly when we recollect that the force of the heart's action is at the same time diminished.

The following experiment will show that, provided the heart's action be maintained, the circulation of black blood may continue through the lung for a considerable time beyond the period at which the circulation ordinarily ceases in asphyxia, and that the cessation of the circulation must consequently depend in a great measure on the failure of that action.

Exp. 10. A tube was adapted to the trachea of a young spaniel. The animal was immediately pithed ; artificial respiration was then set up so as to maintain the heart's action, and the chest was laid open. A ligature was next passed under the right bronchus close by the bifurcation of the trachea, and tied tightly so as to prevent the entrance of any air into the right lung. This was done in about three minutes from the time that the animal was pithed. The in-

* Art. *Asphyxia*, *Cyclop. Anatomy and Physiology*.

flation, which was only carried on by the left lung, was now continued,—the right lung remaining in a mid state between collapse and distension, and quite motionless. The heart was beating tumultuously about 120 per minute.

3d minute after bronchus was tied.—Heart beating from 100 to 120; still very irregularly and tumultuously.

9th minute after ligature of bronchus.—Heart beating forcibly, but rather irregularly, from 60 to 70. A ligature was now passed under one of the pulmonary veins of the right lung, (the obstructed one,) and tied as near as possible to its entrance into the auricle. The vessel was then punctured on the distal side of the ligature, and a jet of semi-venous blood escaped. The blood was not quite black, owing to regurgitation having taken place from the left auricle, as the pulmonary vein was not ligatured until after inflation had been established for several minutes.

11th minute.—Heart beating 45 to 50 more regularly. Inflation of left lung continued. A quantity of perfectly venous blood trickles out of the puncture in the pulmonary vein; a fresh portion collecting and trickling slowly down whenever the puncture was wiped.

14th minute.—Heart beating 45. The black blood continues to ooze from the puncture in the pulmonary vein.

17th minute.—Much the same as at last report, the blood continuing to ooze slowly but very distinctly. During the whole of this time not a bubble of air gained admission into the right lung, and the blood that oozed out of the puncture was perfectly black. Experiment discontinued.

On examination, the pulmonary veins of the left lung and the left auricle were found filled with bright arterial blood, a small quantity of which was also contained in the left ventricle.

Exp. 11. In another experiment of the same kind.—At the tenth minute after the bronchus had been tied, the heart was beating 60 to 64 strongly and regularly; artificial respiration was kept up with the left lung alone, the right one being quite collapsed.

14th minute.—A ligature having been passed under a pulmonary vein of each lung, these vessels were punctured on their distal side. A quantity of black blood flowed from the pulmonary vein of the right lung, whilst from the corresponding vessel of the left lung florid arterial blood escaped in a small jet.

17th minute.—Heart beating about 20 per minute. From the pulmonary vein of the right side dark blood is still flowing, rather slowly, but very distinctly; whilst from that of the left lung a larger quantity of arterial blood is evidently escaping.

19th minute.—Heart 14 to 16; flow of blood still continues, but very slowly.

24th minute.—Ventricular action and the flow of blood from the pulmonary veins have ceased.

The blood that had accumulated in either side of the chest was now carefully collected and measured, when it was found that that which had flowed from the right lung amounted to $2\frac{1}{2}$ drachmas, whilst that from the left amounted to $3\frac{1}{2}$ drachmas; and in another experiment of the same kind the quantities that escaped were respectively $2\frac{3}{4}$ and 4 drachmas.*

From these experiments it is evident that, provided the heart's action be maintained, black blood may be made to circulate through a lung (in which the chemical changes have entirely ceased), for a much longer period than in ordinary cases of asphyxia; the same force that keeps up the circulation of red blood in one lung sufficing for that of black blood in the other; and this, although the force of the heart's contractions must be somewhat enfeebled in consequence of the deficient aëration of the blood when one lung is useless. It is true that the quantity of blood that is sent through the two lungs is not the same, more passing through the left in which respiration is carried on than through the right in which it is arrested; the difference between the two quantities depending probably on the arrest of the respiratory movements, and on the obstructive cause in the pulmonary vessels in the right lung. But yet a considerable quantity passes through, and continues to do so until the impulse of the heart has become so much enfeebled as no longer to have the power to propel the blood through so extensive a vascular system as that of the lungs, and to overcome the obstruction that exists in the vessels of that organ.

That the heart's action is, of itself, sufficient, when vigorous, to keep up the circulation through a lung in which the chemical changes have ceased, and through which dark blood must consequently be passing, is evident from the fact of the circulation continuing actively in lungs that are compressed by effusion into the pleural sac, whether natural, or, as Goodwyn has observed, when artificially induced. In hydrothorax there is not any difficulty in the transmission of blood through the compressed lung, although in this case, as in the experiments just related, the heart's action can hardly be supposed to be as vigorous as usual, inasmuch as the oxygenation of the blood can be but imperfectly performed, one lung only being in action.

The influence of artificial respiration in re-exciting the circulation through the lungs, after the action of the heart has ceased, is generally advanced as an additional argument in favour of the dependence of the circulation through the pulmo-

* This experiment is rather difficult of performance, as the bronchus of the dog is very short, and there is always the danger of the heart's action becoming very much enfeebled, if not entirely arrested before that tube can be ligatured. It is therefore advisable to use young dogs, as the irritability of the heart prevails for a longer time in them than in the older ones.

nary capillaries on the persistence of the vital actions connected with the chemical changes. But if this fact be more closely examined, it will be found that it affords no evidence in favour of this doctrine. It has already been stated as one of the proofs of the existence of an obstruction to the passage of the blood through the capillaries of the lungs, that the pulmonary artery is, in cases of death by asphyxia, invariably found to be in a state of tension from the accumulation of blood in it. This tension is very considerable, so much so, that if, after death, when the heart's action has entirely ceased, a small puncture be made in the vessel, the blood will spout out with some degree of force. When artificial respiration, therefore, is set up, and the venous blood that has accumulated in the lungs has become properly aerated, the tensile condition of the trunk and branches of the pulmonary artery will act as a *vis-a-tergo*, and will propel the newly oxygenized blood into the pulmonary veins and left auricle; the pulmonary artery being always found, after artificial respiration has been continued for a few minutes, flaccid, and emptied of much of its blood. In whatever way, then, the restoration of the chemical changes act in preparing the blood or the smaller vessels for the re-establishment of the pulmonic circulation, and in removing the obstruction to the passage of the blood, an impulse is communicated to that fluid by the *vis-a-tergo* influence of the tension of the pulmonary artery, which will be fully sufficient to propel it into the left side of the heart, and thus (as will hereafter more fully be shown) to re-excite the contractions of that organ.

For the reasons, then, that have just been stated, as well as on account of the uncertainty of the general doctrine of the dependence of the capillary circulation on vital attractions and repulsions between the blood and the vessels connected with the chemical changes, we cannot coincide with the opinion that would refer the stagnation of the blood in the lungs in asphyxia to the cessation of these actions, and must accordingly seek another mode of explaining this remarkable phenomenon.

γ. The next opinion is the one that is advocated by Dr Kay, who supposes that, in consequence of the non-arterialization of the blood, the minute pulmonary vessels, which usually convey arterial, become incapable of transmitting venous blood, which consequently stagnates in the lungs.

If by the "smaller pulmonary vessels," Dr Kay means the capillaries, his explanation cannot, for reasons that will by and by be stated, hold good.

But although the obstruction cannot be supposed to exist in the capillary vessels, may it not reside in the smaller ramifications of the arterial system, including of course the pulmonary veins, as

conveying red blood? This opinion, which has, I believe, been for some time entertained, though not, as far as I know, published by my friend Dr C. J. B. Williams, a gentleman as distinguished for his physiological as for his practical knowledge, appears to me to be the correct one.

The experiments of Dr J. Thomson, Dr Wilson-Philip, Dr Hastings, Dr C. J. B. Williams, Kaltenbrunner, and Wedemeyer, have indubitably proved that the arteries possess a contractile power; and the observations of Hales and of Wedemeyer farther tend to show that this contractility may be excited by the injection through them of fluids of a more or less stimulating character. The supposition is therefore a natural one, that the venous blood which circulates in asphyxia, may act as a stimulus to the smaller divisions of the arterial system, exciting the contractility of these vessels, and that thus the obstruction in the circulation may be occasioned. This, I think, will on closer inquiry prove to be really the fact.

In this way we should be able to explain the continuance of the circulation for a considerable period after the chemical changes have ceased, and, indeed, as long as the heart has power to maintain it. For the contractility that takes place in arteries on the application of a stimulus is a slow process. Dr J. Thomson observes, that though arteries are contractile to a stimulus, a period of from one to three minutes elapses before the contraction begins; and hence we can explain how it is that the obstruction only comes on gradually, and that the circulation is enabled to continue, which, as has already been stated, ought not to be the case if its arrest depended on the cessation of the vital actions connected with the chemical changes.

It may be as well, before proceeding any farther, to notice here the arguments that have been brought against the doctrine under consideration. With one exception these apply to the capillaries and not to the smaller divisions of the arterial system. It is very truly stated by Dr Alison, that the stagnation cannot arise from the stimulus of venous blood being insufficient to excite the capillaries, as it has not been proved that these vessels are irritable, nor that they possess coats. This, however, does not hold good with regard to the smaller arterial ramifications, which, as has already been stated, have been fully proved to possess a contractile power. But, it is argued by Drs Alison and Carpenter, if the stagnation of the blood in the smaller divisions of the pulmonary artery, or in the capillaries of the lungs, depended on any vital action possessed by these vessels, it would follow that venous blood, which makes its way through them so slowly, must be a powerful stimulus to them, and that arterial blood, which is so readily transmitted, must act as a sedative; which is opposed to the fact that

arterial blood and the oxygenized fluids generally possess in every other known instance the stimulating, and venous blood and the carbonized fluids the sedative power.

This argument, however plausible it may be, is very far from being conclusive. In the first place, the same substance may act as a sedative to one set of organs or tissues and as a stimulus to another. Dr Williams* very justly observes, "the elementary action of ice-cold water on the arteries is strictly stimulant; exciting their vital property of contraction; but its operation on textures and organs is sedative, because it impairs the circulation which supports their functions." And again, "Some substances which act as stimulants to the heart and vessels, and to the cerebral functions, operate as sedatives to the medullary system; these are the stimulant antispasmodics they probably operate by giving vigour and equality to the circulation." These observations bear directly on the point in question, and prove clearly that the expressions "stimulant" and "sedative" are merely relative and not positive, and that the cause of the sedative action of one agent on one set of tissues or organs may merely be the effect of its primarily having exercised a stimulant influence on another. But we have distinct evidence of carbonic acid occasionally acting as a stimulant; for when an attempt is made to inspire pure carbonic acid violent spasm of the glottis takes place, which prevents the gas from entering the lungs.† In this case it is clear that carbonic acid acts as the stimulant, and the oxygenized air, so to speak, as the sedative agent.

We find, besides, that every part of the body is provided with a special sensibility, "which determines," to use the words of Bichat, "the nature of its relations with those foreign bodies that may happen to be in contact with it." It is in this way that the peculiar sensibility of the pancreatic, salivary, and parotid ducts, of the *ductus communis choledochus*, and, in a word, of those of all the excretory organs generally, is in exact relation with the nature of their own secretions, but not with heterologous fluids; so that it does not allow these to enter them; and when in their passage before them any particles of a foreign fluid happen to find their way into the ducts they immediately give rise to spasm and contraction. It is for this reason that the excretory ducts, although opening on the mucous surfaces, and in contact with a number of different secretions and substances, never admit any of them,—that the chyme can never find its way into the *ductus communis choledochus*, although its particles would readily be admitted by the mouth of that duct. It is in the same way that we must explain the fact that the absorbent action of the lymphatics is confined to

* Principles of Medicine, pp. 33 and 72.

† Turner's Elements of Chemistry. 4th Ed. p. 267.

particular fluids, some foreign matters being taken up by them, although with difficulty, whilst others are not absorbed at all;—that the mucous membrane of the eye is irritated by a drop of urine or of bile, which have no influence on that of the kidneys or gall-bladder, and that the mucous membrane of the stomach is not sensible to the presence of a foreign body, whilst that of the bladder would be violently irritated by it. These examples might be multiplied to an almost indefinite extent, but a sufficient number have been adduced to show how universally a special sensibility excited by the presence of a heterologous substance is possessed by the tissues of the animal body, and that the agent that calls this sensibility into action need not be a stimulant in the ordinary sense of the word, for it to possess an excitant influence upon a tissue that is unaccustomed to its presence.

That the same property is possessed by the arterial system, has been proved by Hales and Wedemeyer, who, as it has already been stated, have found that stimulating liquids were obstructed in their passage through these vessels. The question, therefore, arises, whether venous blood ought to be considered a stimulant to this system, including, of course, the pulmonary veins. It has already been shown that the term stimulant is a relative one, that it is usually sufficient for a fluid to be a heterologous one for it to possess stimulating properties on the tissue or part to which it is applied, and that merely because it acts as a sedative on one organ, it does not follow that it may not have a stimulant action on another. On reasoning from analogy, therefore, we should be disposed to look upon venous blood as a stimulant to the arterial system, that is, as having a tendency to excite the contractility of these vessels.

But we may go a step farther, and prove that it actually possesses this power; causing these vessels to contract distinctly, as I have several times observed, on examining, under the microscope, the mesentery of rabbits during and immediately after the process of asphyxia. This may be done without much difficulty, as the circulation in these animals, when quite young, continues for many minutes after the struggles of asphyxia have ceased. On asphyxiating a young rabbit, a portion of whose mesentery has been conveniently fixed under a powerful microscope, the following phenomena will be observed to ensue. For about a minute after the struggles of the animal have ceased the circulation appears to be going on with its usual rapidity; it then gradually becomes somewhat slower, the arteries contracting in size, containing less blood, and assuming a lighter and more tawny colour than before, whilst the veins become congested and evidently fuller, assuming, when viewed by transmitted light, a very beautiful crimson hue. As the circulation becomes more languid the arteries continue con-

tracting, and acquire a lighter colour, the diminution in their size, and the difference in the quantity of blood contained in them and in the veins being most marked. The motion of the blood in the capillaries now becomes oscillatory, the whole mass of the blood being at each impulse of the heart slowly propelled forwards, and then moving backwards. This to and fro motion continues for some little time, and then ceases entirely. When the circulation has been completely brought to a stand, the arteries may be observed to be much contracted and flattened, of a light tawny colour, and offering the most marked contrast to the appearance of the veins, which are evidently much distended, and as I have just said, when viewed by transmitted light, of a most beautiful crimson colour. On restoring the heart's action by setting up artificial respiration, an impulse was evidently transmitted from the blood in the arteries to that in the capillaries, in a pulsatory and jerking manner, which was soon communicated to the veins, driving forward the whole mass of globules accumulated in them; and gradually becoming more equable and powerful, until the circulation was completely restored. I have watched these phenomena most attentively in the mesenteries of young rabbits, and have never observed any thing like spontaneous movements in the capillaries; the blood contained in which was invariably most clearly and distinctly influenced solely by the impulses it received from that which was contained in the arteries. Nor have I ever been able to discover any obstruction in the vessels, in consequence of the adhesion of colourless globules to their sides,—a phenomenon that I especially watched for, and which has, by several, been supposed to occur. The diminution in the diameter of the smaller arteries, and the proportionate difference between them and the neighbouring veins was most evident, and was such as could leave no doubt on my mind as to the important part that the contractions of these vessels plays in giving rise to an obstruction to the passage of the blood through them in asphyxia; in which I have no doubt that it is the principal, if not the sole agent.

I do not feel myself called upon to make any remarks on the cause of the arrestment of the sensorial functions in asphyxia, as that subject has already been fully and ably investigated by Dr Reid. Bichat's opinion, that the immediate cause of the suspension of these functions was due to the noxious influence of the venous blood circulating through the cerebral vessels, was disputed by Dr Kay, who endeavoured to prove that this condition is rather attributable to the diminution in the quantity than to any alteration in the quality of the blood circulating through the brain. Dr Reid showed the fallacy of the experiments that were adduced by Dr Kay in support of his doctrine, and proved satisfactorily that the suspension of the functions of the encephalon is chiefly,

if not entirely, dependent upon the circulation of venous blood through its arteries. Not that the venous blood exercises any positively deleterious influence, but rather that it acts by the deprivation of the natural stimulus of arterial blood; the functions of the brain rapidly manifesting themselves when arterial blood is readmitted, provided this be done in a given time. It has likewise been proved by this physiologist that the functions of the cerebral hemispheres are annihilated a short time before those of the *medulla oblongata*, the respiratory movements continuing for a short time after the animal has become quite insensible. I may state generally, without analyzing the evidence on which these statements are founded, that it is in complete accordance with what I have had frequent occasion to observe in experiments on asphyxia.

The mode in which death occurs, and the order in which the vital functions cease in asphyxia, appear to be as follow:—The blood, whilst it is assuming a venous character, passes for some time with tolerable freedom through the vessels of the lungs into the left side of the heart, whence it is propelled through the whole system, causing first a derangement and then a suspension of the functions of the sensorium, so that the animal becomes more and more insensible; perfect unconsciousness and cessation of all voluntary movement occurring in about a minute and a half or two minutes. The functions of the *medulla oblongata* are continued for some little time longer. The blood having now become perfectly venous begins to be obstructed in its passage through the ultimate ramifications of the pulmonary veins and of the arterial system generally, occasioning congestions of the pulmonary artery, of the right cavities of the heart, and of the whole of the venous system, and the quantity sent to the left side of the heart becomes materially lessened. The obstruction in the vessels goes on increasing, and coincident with this is a diminution in the activity of the heart's action, which becomes both slower and feebler in consequence of the lessened quantity and altered quality of the blood that finds its way into the left ventricle and that is propelled into the coronary arteries, until at last, from a concurrence of these several causes, stagnation of the blood in the vessels of the lungs, diminution in the quantity, and alteration in the quality of the blood supplied to the substance of the heart, and distension of the right auricle and ventricle, this organ ceases to contract, and organic life becomes extinct.

Before concluding this part of the paper, it may be as well to mention the average period at which I have found, in the course of a considerable number of observations, some of the principal phenomena of asphyxia occur.

Voluntary movements cease in

.

1½ minutes.

Involuntary movements in	2½ minutes.
Blood in arteries becomes as black as that in the veins in	1½
Occasionally as early as	1½
Contractions of the ventricles cease in	9½
The earliest that I have observed has been in	6½
The latest in adult animals in	14
Twitchings and irregular movements continue for some little time longer.	
The left auricle on an average in	12
I have seen it in an adult animal continue to contract till the	37th
The right auricle on an average in	19½
I have seen it in an adult animal continue to contract till the	44th
Pulsations continue in the femoral artery on an average for	½

In very young animals the time that the contractility of different parts of the muscular system is maintained is very different. In puppies four days old movements continued for 16 minutes. Ventricles continued acting regularly for 1 hour 57

But twitchings and irregular movements continued for 3 hours 4

Auricles continued acting for 3 hours 25

The points, then, that I have more particularly endeavoured to establish in this part of the paper are,

1st, That although the persistence of the respiratory movements has some influence in maintaining the circulation through the lungs, yet that their arrest is not by any means the sole cause of the cessation of the circulation.

2d, That a diminution in the force and frequency of the contractions of the heart consequent upon the altered quality and lessened quantity of the blood circulating through its muscular substance, is one of the principal causes of the cessation of the circulation in asphyxia, as is evident from the fact that, when the force of the heart's contractions is maintained by a supply of arterial blood to its muscular substance, it is enabled to propel black blood through a collapsed lung.

3d, That the obstruction which has been proved to take place in the pulmonary and systemic circulation is due to the venous blood exciting the contractility of the minute divisions of the arteries and pulmonary veins by acting upon their special sensibility.

4th, That the cause of the stoppage of the circulation in asphyxia is therefore threefold; depending, 1. Upon the arrest of the respiratory movements; 2. Upon the weakening of the heart's action; and 3. Upon the obstruction offered to the blood (pro-

pelled with diminished force) by the refusal of the pulmonary veins and minute arteries to receive venous blood.

Treatment.—We will now proceed to the consideration of some of the more important points connected with the treatment of asphyxia; and in so doing it is not my intention to give a history of the subject, or even a resumé of the principal plans that have been recommended for the recovery of persons labouring under the disease in question, but rather to confine the remarks that I have to make to the discussion of some of the points that are more particularly insisted upon by the Royal Humane Society, and to suggest some new or modified plans of treatment that will, I hope, be found to prove serviceable in particular cases of asphyxia.

Before entering more at length upon this subject, it will be better to understand clearly the principal objects that ought to be fulfilled in the treatment of asphyxia. It has been shown in the preceding pages that one of the chief causes of the arrest of the circulation in this disease is the obstacle offered to the passage of the blood through the lungs consequent upon the cessation of its arterialization and the arrest of the respiratory movements, and that the contractions of the heart cease, and the functions of the brain and nervous centres become suspended, in consequence of the circulation of unoxxygenized blood, deficient in stimulating and nutritious properties, through their tissues. Our first object should therefore be to arterialize the blood, and our second to restore or maintain the action of the heart, and thus cause the freshly aerated blood to circulate through the nervous centres, on which it acts as the most powerful stimulant, re-exciting the functions of the *medulla oblongata* and the nerves of respiration, and thus enabling the respiratory movements to be properly maintained, and consequently the oxygenation of the blood to be naturally performed.

Such being the principal indications to be accomplished in the treatment of asphyxia generally, we will now proceed to the consideration of the most efficient mode of carrying them out in those cases of suspended animation that proceed from drowning, which, as being the most frequent, are the most important to be properly understood.

As it is not necessary in every stage of asphyxia to have recourse to the same plan of treatment, I think that it will tend to place this subject in a clearer light if we divide the cases of this disease into the two following classes:—

1st, Those in which the action of the heart is still continuing, however feebly.

2d, Those in which the action of the heart has ceased.

It would be a matter of some importance in the treatment of asphyxia if the average time at which the heart ceases to beat could be ascertained with any degree of accuracy. This it is, however, exceedingly difficult, if not impossible to do, as the time may be much prolonged by the existence of a number of modifying circumstances, such as the quantity of air that may be contained in the lungs at the time of submersion—whether the sufferer struggles much, or remains quiet, (muscular movements having a tendency to cause more rapid consumption of the oxygen), his age and strength, and lastly, the condition of his nervous system. For if fainting ensue, in consequence of the mental shock experienced at the moment of immersion, submersion may last a very considerable time, and the actions of the heart will still continue,—the person suffering from syncope rather than from asphyxia. The discrepancies that occur in the statements of authors, as to the length of time that recovery is possible after submersion, are no doubt attributable to these two conditions—syncope and asphyxia—having been confounded together; insensibility, which is common to both, being the chief symptom that has been taken into account.

As syncope appears to be a common consequence of submersion, it is necessarily a point of some importance to inquire into the physiological differences between that condition and asphyxia. In syncope the primary impression is upon the nervous system, and the heart and circulatory apparatus are secondarily affected. The motions of the heart become much enfeebled, but still they continue; and a certain quantity of blood, small indeed in amount, continues to circulate through the lungs, consuming slowly the oxygen of the residual air left in them, which appears to be sufficient for the maintenance, for a considerable time, of the diminished vitality of the whole system. In this respect a person in a prolonged syncope resembles an animal during hybernation; the functional activity of the cerebrum appearing to be suspended, and animal life to be extinct; but yet the organic existence is prolonged, though in a feeble and imperfect manner. In asphyxia, on the other hand, the primary disorder is to be looked for in the respiratory and circulating systems, the brain and *medulla oblongata* being only secondarily affected. The blood rapidly assuming a venous character, becomes incapable of affording a proper stimulus to the heart, and being arrested, partly from the want of a due propulsive power in that organ, and partly from its inability to pass through the smaller arterial ramifications, the functions of organic life become extinct in the way that has already been explained. The pathological conditions of the system differing so materially in these two diseases, the treatment ought not, of course, to be directed to the same ends. In the one case, we should endeavour to reoxygenize the blood; in the other, to rouse the sensibility of the brain and *medulla oblongata*.

The difference in the appearance of a person in a state of syncope, and of one that is labouring under asphyxia, is equally well marked. In syncope the face is pale and bloodless, the features sunk and contracted, and the eyes partially or entirely closed. In asphyxia, on the contrary, the face is livid and bloated, the lips swollen, and the eyes open. But distinct as these appearances may be in pure and uncomplicated cases of each affection, yet they do frequently, in actual practice, run into one another, and are conjoined in greater or less proportion, so that they lose much of their value, and we are obliged to be guided in our treatment, rather by general rules than by an endeavour to ascertain how much of each case is referrible to asphyxia, and how much to syncope.

The essential practical difference between syncope and asphyxia is, that in the former case the contractions of the heart, though much enfeebled, may continue for a considerable, almost an indefinite, period; whereas in the latter they quickly cease. The precise time in which the heart ceases to beat in cases of unmixed asphyxia is very difficult to ascertain in man. In dogs, as has already been stated, the ventricular action continues on an average for $9\frac{1}{2}$, and occasionally for 14 minutes, the difference depending probably on the age of the animal, and I do not remember ever to have failed in re-exciting its action by the artificial inflation of the lungs at any period before the ventricular contractions had ceased; as I have frequently ascertained by opening the chest after the animal has been asphyxiated, but before the heart has ceased beating, and then inflating the lungs. In asphyxia from drowning, in man, unattended by syncope, I should suppose that the contractions of the ventricles have most generally ceased before five minutes have elapsed after complete submersion. My reason for this assumption, which it is exceedingly difficult to prove, is, that Mr Woolley, the surgeon to the Humane Society's Receiving-House in Hyde Park, and a gentleman of great experience in these matters, states, in the reports of that institution, that no cases were saved that had been more than four minutes under water. And I understand, on good authority, that it is very seldom that cases that have been less than four minutes under water are lost. Now, as the measures adopted by this Society do not act directly upon the blood-vessels of the lungs, or upon the heart, they can most probably only be successful whilst that organ is still pulsating, and will fail in all those cases in which the contractions of the heart have either entirely ceased, or have become so excessively enfeebled as to require the application of a direct stimulus, in order to re-excite them. It is true that, since this statement was made, two cases have been related in the reports of the Humane Society, one in that for the year 1840, another in that for 1843, in both of which the time of submersion appeared to amount to

five minutes. There were several circumstances attending these cases, however, that render them less important than they otherwise might have been in determining the point in question. Mr Woolley speaks thus of the first case: "Walsh was five minutes under water, and during the whole of that time the process of expelling air from the lungs was seen to go on. The lungs must, by the end of that time, have been in a state of collapse, and, on being taken out, the atmospheric pressure would necessarily fill with air the vacuum which had been formed, and the spontaneous return of respiration proved that there was nothing present in the lungs to prevent it." I shall by and by have occasion to advert again to this very interesting case; in the meantime I will content myself with pointing to the fact, that the process of respiration was spontaneously re-established; and that consequently this case can scarcely be adduced in illustration of the time that the organic functions cease in asphyxia, as the inspiratory efforts that were spontaneously made, might possibly, by arterializing a certain quantity of blood, have re-excited the contractions of the heart.

The second case, which occurred in June 1842, although most interesting in itself, is equally unsatisfactory as regards the point at issue; for, in relating it, the superintendent says, "Whilst cutting off her clothes, I heard for the first time a rattling in the chest, which I thought was an effort to breathe." In this instance, therefore, it is also possible that an artificial inspiration, spontaneously performed, re-excited or kept up the contractions of the heart.

As these cases cannot, therefore, as far as the point under discussion is concerned, justly be considered unequivocal exceptions to the fact deducible from Mr Woolley's remarks, I think that we are justified in taking four minutes as the minimum time that the heart continues to contract in cases of submersion; patients during that period being recoverable by means that do not directly influence it; such as the warm bath and friction.* When the contractions of that organ persist long after this, there is probably a state of syncope rather than of asphyxia; the sufferer having fainted at the moment of immersion, or very shortly afterwards, before there had been time for the process of asphyxia to make much progress.

We will now proceed to the consideration of the general plan of treatment that is to be adopted in those cases in which the period of submersion does not exceed four minutes. And here

* I have been informed by Mr Woolley that he believes that several other cases of recovery have occurred, in which the patient has been more than four minutes (in one case probably six minutes) under water; the men employed by the R.H.S. having been found to be in the habit of understating the time that the sufferers have been submerged. This, however, does not influence the statement about the minimum time at which the heart ceases to act.

it may be stated, that these constitute by far the largest majority of cases of drowning. Thus, for instance, in the Report of the Humane Society for 1840, it is stated that 185 cases were brought under the notice of that institution during the preceding year; and that, out of these, only sixteen were not recovered. Now, as it is stated in that very report, by the very intelligent and humane surgeon of the Receiving House in Hyde Park, that, with one exception, no case had been thus saved that had been more than four minutes under water, it must necessarily follow that at least 168 out of the 185 cases must have been submersed for a less period than four minutes.

The means recommended by the Humane Society for the recovery of persons from drowning, and employed at their institution in Hyde Park, appear to be well adapted for the treatment of this stage of asphyxia. They consist, after the nose and mouth have been cleared of any mucosities, in the application of heat by means of a bath at about the temperature of 100°, until the natural warmth is restored, in the employment of brisk friction, and in passing ammonia to and fro under the nostrils. It is evident that these measures can have no direct influence upon the heart and lungs; but can only act as general stimuli to the system, equalizing the circulation if it be still going on; and, by determining to the surface, tending to remove those congestions that are not so much the consequences of the asphyxia, as of the sojourn of the body for several minutes in cold water. They would, therefore, be of especial service during the colder seasons of the year. A hot bath may also, by the shock it gives, excite the reflex respiratory movements. With the view of doing this with a greater degree of certainty, I would suggest that cold water be sprinkled or dashed upon the face at the time that the body is immersed in the hot-bath, as in this way a most powerful exciting influence can be communicated to the respiratory muscles; and the first object of treatment in all cases of asphyxia, the re-establishment of respiration, would more rapidly and effectually be accomplished; deep gaspings ensuing, by which the air would be sucked into the remotest ramifications of the air-cells, arterializing the blood that had accumulated in the pulmonary vessels, enabling it to find its way to the left cavities of the heart, and thus to excite that organ to increased activity. The recommendations of the Humane Society appear to be most judicious, as far as regards those cases of asphyxia in which the sufferer has been but a short time submersed, and in which the heart is still acting, and the respiratory movements have either begun of their own accord on the patient being removed from the water, or in which they are capable of being excited by the shock of a hot-bath, aided, as I would suggest, by the dashing of cold water in the face. The

lungs should, at the same time, be inflated by compressing the chest and abdomen, so as to expel the vitiated air, and then allowing them to recover their usual dimensions by the natural resiliency of their parietes. A small quantity of air will, in this way, be sucked in, each time the chest is allowed to expand, and thus the re-establishment of the natural process of respiration may be much hastened. This simple mode of restoring the vital actions should never be omitted, as it is not attended with the least danger, and does not in any way interfere with the other measures employed. If, by these means, we succeed in restoring the proper action of the respiratory movements, it will merely be necessary to pay attention to some points of the after treatment that will presently be adverted to. Should we, however, fail in restoring respiration, we should have recourse to other means that will immediately be mentioned.

We now come to the treatment of the second class of cases, those in which the action of the heart has entirely ceased, or in which the sufferer has been submersed for more than four minutes.

When a person is withdrawn from the water, after having been immersed for a few minutes, the surface of the body is invariably cold and the vessels constricted. The first indication of treatment, therefore, that naturally presents itself is the application of warmth, so as to restore the natural temperature, and as soon as the circulation may be re-established, by determining to the surface, to relieve internal congestions. Two questions, however, present themselves *in limine*.

1st, What temperature is it advisable to employ?

2d, How is the warmth to be applied?

The intimate connection between animal heat and respiration is well known to all physiologists; the temperature of an animal being in proportion to the quantity of air that it consumes; and, (as every one knows,) in hybernation, a condition that presents many analogies with asphyxia, the respiratory function is much enfeebled, and the evolution of animal heat greatly diminished. These facts are so universally known, that it is needless for me to do more than allude to them as illustrations of the subject under consideration. Edwards has further shown that an increase of temperature compels an animal to consume more oxygen; that when the temperature of the medium in which an animal is placed is raised, the activity of its respiratory functions must be proportionally increased, and experiment has proved, that if the temperature of animals in a torpid condition be suddenly raised fatal results are very apt to follow. These facts are of much value in determining the degree of heat that ought to be applied to man when his vital actions are depressed. The Humane Society recommend a bath of a temperature of from 98° to 100°, or "as

hot as the hand can bear without pain," as well as hot bricks, bottles of hot water, or blankets wrung out of hot water. Now this degree of heat may perhaps be applied with safety to persons who have been immersed during the summer months, when the temperature of the water is between 50° and 60° ; but if any dependence can be placed on the observations of Edwards, which are most trustworthy, it would unquestionably be far too high to be safely applied to persons who have been immersed during the winter, when the temperature of the water is perhaps but little above 32° . In this case I should certainly (being guided by those observations) recommend that the patient be not at first exposed to a greater degree of heat than from 85 to 90 degrees.

The next subject for consideration is, to say the least, an equally important one; I allude to the nature of the medium through which warmth is to be applied; and although the warm bath would appear to be the most efficacious means of accomplishing this, yet I perfectly agree with the opinion of Drs Kay and Carpenter that its employment is open to very serious objections, and is most decidedly opposed to two well-ascertained facts in physiology; namely, that the integument, even in man, acts as a respiratory organ, and that the direct influence of air upon it acts as an excitator to the respiratory movements.

That the skin acts as a respiratory organ of much importance in the lower animals, is so familiar a fact that I need not dwell upon it. The following experiment, which was performed in conjunction with Dr Sharpey, places its importance in asphyxia in a strong light, and serves to show that the respiratory function of the skin is of itself sufficient, without any action of the lungs, to excite the action of the heart, and, to a certain extent, to restore the circulation.

Exp. 12.—A middle-sized frog was immersed in soda water. Immediately before immersion the respirations were 132 in a minute, and the pulsations 56. After having been twenty-two minutes in the liquid all movement ceased. It was then withdrawn, and the heart was seen to pulsate slowly through the parietes of the thorax. This soon became so feeble as no longer to be perceptible.

Five minutes after it was removed the web was examined under the microscope; the circulation was not general, indeed almost stopped, merely going on in one or two of the larger vessels.

In eight minutes the circulation was becoming more active, with occasional interruptions only.

12th minute.—Heart distinctly beating 22 in a minute,—circulation active in the web. On irritating the eyeball with forceps no motion followed; pinching the skin at the verge of the anus had no effect.

18th minute.—Heart pulsating 26 per minute.

19th minute.—Animal beginning to breathe again.

22d minute.—Heart pulsating 29 per minute. On touching the eyelid with forceps it immediately contracted. Respiration not fully established; breathes only at intervals.

25th minute.—Heart beating 36 per minute.

In this experiment, which I have several times repeated with the same general results, it is evident that the increase in the frequency of the heart's pulsations, after the animal was removed from the soda water, and before it breathed, can only be accounted for by the exposure of the integuments to the action of the air, by which a certain quantity of oxygen was absorbed, and that the carbonized blood becoming thus aerated, the heart's action was restored in the same way as if that change had taken place in the lungs.

That the human integument likewise exercises a respiratory action, although to a minor degree, is equally well known. Cruickshank, Abernethy, and Collard de Martigny have fully proved that carbonic acid is evolved and oxygen absorbed when the skin is exposed to the air. Abernethy in particular has made many interesting observations on this subject, and states that, on introducing his hand into a glass jar filled with air, and inverted over mercury, carbonic acid was abundantly eliminated and oxygen absorbed. It being therefore, in the treatment of asphyxia, one of our principal objects to oxygenize the blood as rapidly and as quickly as possible, and as it has been proved by the experiments just related, that this may, to a certain extent, be accomplished in the lower animals, and, by Abernethy's observations, that it also happens in man when the integument is exposed to the air; we are, I think, from analogy as well as from actual observation, justified in concluding that, in the human subject, a certain quantity of the carbonic acid that is accumulated in the system might be eliminated, and a corresponding quantity of the asphyxial blood oxygenized by the free exposure of the integument to the vivifying influence of the atmosphere. In this way the blood in the capillaries of the whole of the surface would undergo its proper chemical changes, and would be more readily influenced by the contractions of the heart, in consequence of the removal, to a certain extent, of the obstruction to the passage of the carbonized blood that has been shown to exist in the systemic vessels. The aëration of the blood in the superficial vessels might also, perhaps, in some degree, of itself, tend to the re-establishment of the natural temperature of the body.

The direct action, likewise, of the air upon a large extent of the cutaneous surface will further, as is well known, have a tendency to excite the respiratory movements, and will thus aid our endeavours to establish the act of respiration in a natural way.

The apparatus necessary for applying hot air is exceedingly simple. The patient, after being properly dried, should be laid on the kind of bed, if it be at hand, that was used for cholera patients, and that is at present occasionally, I believe, employed at the Receiving-House of the Humane Society. It is furnished with a tin mattress for receiving hot water. This mode of applying heat has the additional advantage over the hot bath, of the temperature being gradually and progressively increased by it, whereas the converse is the case in a bath; which is at its highest temperature at the moment that the body is immersed, and rapidly cools afterwards. If these means could not readily be put in practice, the temperature of the room in which the patient lies might be raised to 70 or 80 degrees, or the body might be exposed to the influence of a large fire, at some distance however, and a warming-pan covered with flannel might be passed repeatedly over it. Artificial respiration and other means that it might be thought advisable to employ could also be more conveniently applied to a patient lying in a bed than to an inanimate body supported in a bath. These advantages, however, great as they indubitably are, I look upon as secondary in comparison to the very important one of the exposure of so large a mass of blood as that which is contained in the capillaries of so vascular an organ as the skin to the influence of an oxydizing agent.

Whilst heat is being applied in one or other of the ways above mentioned, friction, as recommended by the Society, should be employed, either with the hand or with a horse-hair glove, or a soft flesh brush, so as to equalize the circulation as rapidly as possible, and to stimulate the action of the cutaneous vessels.

We will now proceed to make a few remarks on by far the most interesting and important question connected with the treatment of asphyxia, namely, the value of artificial respiration, and the best mode of employing it; on both of which points it would appear that considerable diversity of opinion exists amongst physiologists and practical men. Haller, Hunter, Goodwyn, Coleman, Bichat, Kay, Carpenter, and indeed almost every writer on asphyxia, from the time that the chemical changes that take place between the blood and the air in the lungs began to be understood, down to the present day, have insisted on the paramount importance of supplying the blood in the pulmonary vessels with fresh air, in some way or another, as rapidly as possible. On the other hand, the Royal Humane Society, acting under the guidance of the medical members of its committee, namely, Sir B. Brodie, Mr Dalrymple and Mr Woolley, gentlemen whose names entitle any opinion that may emanate from them to the most serious consideration of the profession, has somewhat discountenanced the employment of this means, which, I understand, is but rarely had recourse to at the institution in Hyde Park.

In that Society's report for the year 1840 we find the following paragraph. "It is the opinion of the medical members of the committee, that the period in cases of asphyxia when artificial respiration might be successful, is very short and scarcely more than momentary, and, as it but rarely happens that such measures can be applied at the precise moment, artificial respiration should be considered a secondary means." Again, in the report for the year 1842, Sir B. Brodie says, "It appears to me that there are very few of these cases in which this method is really applicable. In an individual who dies at once, either from drowning or from strangulation, the action of the heart continues during a very short period (perhaps not more than two or three minutes) after the muscles of respiration have become incapable of performing their office. If in this interval the lungs be inflated, the action of the heart will be maintained until that of the respiratory muscles is restored, and thus the life of the patient may be preserved." This most distinguished surgeon and physiologist then goes on to remark on the lapse of time that must ensue before the proper apparatus can be adjusted, and says, "We must admit that it can scarcely ever happen that life will be preserved by these means at this period when it could have been preserved otherwise." He, however, recommends the adoption of artificial respiration in those cases of secondary asphyxia in which the patient, after having been revived for a time, gradually appears to sink again into a state of insensibility, being, as Dr Davy expresses it, "poisoned by his own blood." Sir B. Brodie is further of opinion, that the action of the heart cannot be re-excited by inflation of the lungs after it has once ceased.*

In this divided state of opinion between men whose views are equally entitled to our consideration, it will be well, in order to come to something like a conclusion upon this important subject, to examine it in detail, and more particularly with regard to the following questions:—

1st, Can artificial respiration re-establish the circulation through the lungs after it has entirely ceased?

2d, Can it re-excite the contractions of the heart after they have entirely ceased?

That insufflation of the lungs with atmospheric air can re-establish the circulation in these organs after it has entirely ceased, and after they have become congested with asphyxial blood, there can be no doubt from the following experiment, which is one

* Since these sheets were in the press I have been informed by Mr Woolley that the practice adopted by him at the Receiving House of the Society, is to employ artificial respiration in all those cases in which the respiratory actions are not naturally restored on taking the sufferer out of the water, or on placing him in the hot-bath. My observations in the text apply, therefore, solely to the published reports of the Society, and not to the practice of my friend Mr Woolley.

chosen almost at random from a considerable number on the same subject, performed by Dr Sharpey and myself.

Exp. 13.—A pipe, with a stop-cock adapted to it, was introduced into the trachea of a young middle-sized mongrel terrier; the cock was then shut.

In half a minute the animal began to struggle. The struggles continued with occasional intermission until

2½ minutes, when they ceased. At the 7th minute, the animal being quite dead, the heart was exposed and the pericardium opened; it was acting freely. Vessels on its surface were uniformly black; the arteries and veins equally so. Both the auricles were black; the right auricle was distended, the left full.

8th minute.—Ventricles ceased to contract regularly, but tremulous movements continued in their muscular fibres. Auricles acting strongly and regularly, from 50 to 60 in a minute. Sometimes more rapidly, about 80. Right side of heart much distended. Pulmonary artery appeared very tense. Pulmonary veins at the roots of the lungs were full and perfectly black. Lungs collapsed, mottled darkly.

13th minute.—Contractions of auricles less powerful. Blood still flowed from mammary arteries on being cut.

20th.—Auricles acting feebly, contractions chiefly, if not entirely, at the tip.

29th.—Auricles ceased.

30th.—Auricles recommenced acting, but very irregularly.

34th.—Auricles ceased acting for about half a minute, then began again to pulsate, then ceased again; then began again to contract about once every quarter of a minute.

37th.—Left auricle ceased entirely.

44th.—Right auricle ceased entirely; both auricles perfectly black; left auricle, to all appearance, nearly empty; right auricle distended.

45½ minutes after trachea had been closed.—Artificial respiration was now commenced.

49½ minutes.—Left auricle has decidedly become of a much more florid hue; on puncturing its tip, red blood escaped in small quantity; on squeezing auricle a quantity of blood of a darker hue, but not decidedly venous, escaped.

54th minute.—The blood that now escapes is perfectly florid; the tip of the auricle was now tied up.

57th minute.—Coronary arteries of a distinctly lighter colour than the veins; the femoral artery which was exposed was quite black; the branches of the pulmonary veins at the roots of the lungs of a very decidedly lighter colour than those of the pulmonary artery in the same situation, which are still black.

73d minute.—On puncturing the left auricle at the point of

junction with the pulmonary veins, a very large quantity of perfectly bright arterial blood issued in a small jet a line or two in height. The insufflation being continued, perfectly florid blood continued to well out each time the lung was distended.

On opening the pulmonary artery, the branches of which were very much less full than they had been, some black blood was found in it; this, however, seemed barely sufficient to fill the vessel, and certainly there was no tension of the coats of the artery. The lungs, which had been of a dark mottled hue, had become quite light coloured.

This experiment, which I have repeated a great number of times with the same results, presents several points of interest. In the first place, it clearly proves the possibility of the re-establishment of the circulation through the lungs after the heart's action has entirely ceased. For although artificial respiration was not established until $37\frac{1}{2}$ minutes after the ventricles had ceased to contract, yet the blood that had stagnated in the vessels of the lungs rapidly became oxygenized, and passed in large quantity into the left cavities of the heart, as was proved not only by the free gush of arterial blood when the left auricle was punctured, but also by the pulmonary artery, which had previously been much distended, becoming lax and emptying itself almost entirely of blood.

The mechanism of the passage of the blood through the pulmonary vessels in these experiments, after the heart's action had entirely ceased, is an interesting subject. As it has already been explained in a former portion of this paper, it will not be necessary to dwell particularly upon it here. I may, however, state that it appears to be owing to the *vis-a-tergo* influence of the tense pulmonary artery forcing the blood through the pulmonary veins, after the obstacle that exists in them has been removed by the aëration of the blood contained in them. That the passage of the newly oxygenized blood into the left auricle is also materially aided by the respiratory movements, is evident from the fact of its welling out in a fuller stream from a punctured pulmonary vein, each time the lungs are distended with air. This fact, which was noticed in the experiment, the details of which have just been given, I have frequently observed, and it illustrates in a striking manner the influence of the respiratory movements on the circulation through the lungs.

Another point of interest is the length of time after which artificial respiration will still oxygenize the blood that has stagnated in the lungs. In the experiment just related, blood continued to be arterialized seventy-three minutes after the trachea had been closed, and more than an hour after the ventricles had ceased acting, and the circulation consequently been brought to a stand. I have not made any experiments to ascertain the maximum of the

time at which artificial respiration will oxygenize the blood in the pulmonary vessels, but have no doubt that it is considerably more than has even just been mentioned, probably until coagulation takes place.

The next question is, how long, after the entry of air into the lungs has been prevented, can artificial respiration restore the heart's action?

The experiments of Dr Roesler* afford very interesting evidence on this point. This gentleman found in three of his experiments that animals, (two rabbits and a cat), which had been kept under water for $5\frac{1}{4}$, $9\frac{1}{4}$, and $11\frac{1}{4}$ minutes respectively, were restored by artificial respiration, although it was not commenced until six minutes after they had been removed from the water; which time was consumed in drying and warming the animal. In another series of eight experiments, in which the inflation was performed with warm air, and in which the duration of submersion, after life had apparently ceased, was respectively 0, 2, 4, 4, 4, 6, 8, 8 minutes; and the whole duration of the asphyxia 7' 50'', 9' 50'', 11' 50'', 11' 50'', 11' 50'', 13' 50'', 15' 50'', 15' 50''; five were saved, namely, the first, second, third, fourth, and sixth.† “The temperature of the air of inflation varied from 95° to 98° 5'; and the warmest air appears to have been most useful. The duration of the treatment was considerably shorter than was required with temperate air. It was seldom requisite to continue the treatment above 20 or 25 minutes, and once only about three-quarters of an hour. It would, however, appear that in some cases he failed although the same curative means were employed; and that even when the animals were taken out of the water as soon as they had expired. The reason of this will by and by appear.

These experiments of Dr Roesler are exceedingly valuable, as proving the length of time after which life may be restored in an animal apparently dead from drowning, and which has been submersed for a considerable period after life appeared to be extinct. For it must be remembered that, in all the cases, six minutes were consumed in rubbing and drying the animal after it had been withdrawn from the water, and before inflation was commenced. As the reviewer of Dr Roesler's experiments in the *Edinburgh Medical and Surgical Journal* very justly remarks, “It may be said that during the six minutes the animal lay in the air before the lungs were inflated, an obscure respiration might have been going on. But every one who is practically familiar with the phenomena of suspended animation, must know that this was impossible. After an animal has been asphyxiated so long that its breathing has ceased, the first efforts to renew respiration are

* *Edin. Med. and Surg. Journal*, Vol. xxiii.

† *Loc. cit.* p. 213.

never obscure ; they are convulsive gasps attended with spasm of the whole body, such as no one could possibly fail to notice, who was occupied with preparations to resuscitate it. But even granting that the animals did breathe during this period, still Dr Roesler was enabled to resuscitate, by artificial respiration, animals that had been submersed for $11\frac{1}{2}$ and $13\frac{1}{2}$ minutes."

Now, as I have already stated in a former part of this paper, the average time that I have found the ventricles to continue to contract in adult dogs is $9\frac{1}{2}$ minutes, and the longest that I have observed has been 14 minutes. Thus, then, in Dr Roesler's experiments it is very possible that, in the cases of recovery, although the animal had been immersed in water for 11 or 13 minutes, the ventricles had not entirely ceased to act before inflation was commenced ; which is by no means unlikely if the animal be young. In this way we might account for the occasional failure of the same means, even when put in practice at a much earlier period, as I have occasionally found the ventricles cease to act as early as the sixth minute after the commencement of asphyxia. I believe that the principal cause of the difference in the length of time that the heart continues to contract in cases of asphyxia depends, *cæteris paribus*, upon the age of the animal. It is certainly the result of my observations, that the younger the animal is, the longer does the heart continue to contract after asphyxia has been set up. That other causes, such as the quantity of air contained in the lungs at the moment when the windpipe is closed, &c., may also have some influence is possible, but the principal one is undoubtedly the age of the animal, the irritability of muscles continuing much longer in young than in old animals.

Dr Roesler's experiments, therefore, interesting and important as they undoubtedly are, cannot fairly be adduced in confirmation of the opinion, that artificial respiration can restore the heart's action after this has entirely ceased ; as the success that he had in some cases may very probably have been the consequence of artificial respiration having been set up before the ventricles had ceased to contract. The only way in which the influence of artificial respiration in restoring the heart's contractions, after these have entirely ceased, can be accurately determined, is, after an animal has been asphyxiated, to lay open the chest and expose the heart before this organ has ceased to act ; and then, when its contractions have ceased, to begin the inflation of the lungs, and to note the effect produced. This I have frequently done at least a dozen times, and I can most distinctly state, that I have never in any one instance been able, by the inflation of atmospheric air, to restore the contractions of the ventricles, if they had once fairly ceased, notwithstanding that the blood in the pulmonary veins and the left auricle became florid and

arterial in the course of a few minutes. I have, indeed, occasionally noticed slight convulsive twitchings and tremulous motions in the ventricles, but never anything like regular contractile movements. What is very remarkable, however, is that very commonly the right auricle, and sometimes the left one, begins to contract regularly and forcibly after artificial respiration has been kept up for some length of time. The following experiment may be selected from amongst many others, as affording a good illustration of the phenomena of artificial respiration after the heart's action has ceased.

Exp. 14.—A small, rather young, black terrier was strangled by introducing a pipe with a stop-cock into the trachea, and then closing the cock. Strong movements of chest and fore legs ensued. In one and a half minute it was quiet.

3d minute.—Chest opened; lungs were found distended and not materially congested; blood from a cut artery perfectly black; colour of coronary arteries and of pulmonary veins quite black; left auricle dark, the same as the right.

14th.—Both auricles and ventricles acting feebly and at long intervals.

18th.—Slight movement of right auricle. The rest of heart quiet.

19th.—Still slight twitches of right auricle.

22d.—Right auricle quiet. Artificial inflation begun.

24th.—Pericardium opened; heart quite quiet.

36½.—Right auricle contracting distinctly and regularly, also feeble contractions of left auricle.

37th.—Left auricle contracts quite distinctly.

39th.—Contractions of left auricle more forcible and frequent.

42d.—Tremulous motions of right ventricle.

47th.—Tremulous motions of right ventricle, and the contractions of left auricle continue; right auricle quiet.

The larger branches of the pulmonary veins and artery have now been for some time nearly empty of blood, though distended before the inflation was commenced.

51st.—Colour of left auricle has for some time been gradually turning brighter. It is now most decidedly much brighter than that of right auricle, which has preserved its original colour. The pulmonary veins appear to contain some blood, which is of a decidedly brighter colour than what they contained before inflation. One of the branches of the coronary artery was now punctured, and perfectly florid blood escaped, and continued to drain from the opening. The accompanying coronary vein was now punctured, and was found to contain black blood.

64th.—Inflation stopped. Both auricles still acting, with frequent tremulous contractile movements in the right ventricle, especially about its base.

The left auricle was found to contain a moderate quantity of fluid blood, very distinctly florid. A considerable quantity drained from the pulmonary veins of a beautiful arterial tint. There were two or three small coagula in the left auricle. Left ventricle contained a considerable quantity of dark coagula, mixed with florid blood. Right cavities contained dark coagulated blood in larger quantity than the corresponding left ones. The pulmonary artery yielded a small quantity of fluid blood, lighter than that of right ventricle, but not so bright as that of pulmonary veins.

This experiment presents several points of interest; amongst others, it shows how easily arterial blood can pass into the coronary arteries independently of any contraction of the left ventricle; and that the contractions of the auricles may be restored after they have entirely ceased, although those of the ventricles cannot. In a considerable number of experiments that I have performed on this subject, I have never succeeded in re-exciting the contractions of the ventricles by means of the inflation of the lungs with common air, provided they had fairly ceased to act before artificial respiration was set up; the reason of which probably is, that when common atmospheric air is used, so long a time elapses before perfectly arterialized blood can find its way into the left cavities of the heart, that the irritability of this organ is lost to such an extent that it is no longer excitable by the stimulus of red blood. I think, therefore, that we may agree with Sir Benjamin Brodie, that the action of the heart cannot in general be restored by this means after it has once ceased. But on the other hand, there is never any difficulty in re-exciting the action of this organ, if regular contractions of the ventricles are still continuing, however feebly and slowly.

But although artificial respiration may fail in re-exciting the contractions of the heart when these have once ceased, are we on this account to discard its judicious employment in the treatment of asphyxia? I think not; for if we fail in restoring the action of the heart by a means that acts so directly upon it as that of supplying its left cavities with arterial blood does, we shall most certainly be unable to accomplish it by such measures as the application of warmth, the employment of friction, &c. which can only exert an indirect influence upon it; and which can do nothing more than maintain or equalize the circulation if it is still being carried on; but which are utterly unable to restore the contractions of the heart, or to remove the cause that has occasioned their cessation; and the less reason is there, I think, in not employing artificial respiration, as it does not, in the slightest degree, interfere with the administration of those other remedial measures that it may be thought desirable to have recourse to in the treatment of asphyxia.

The object of most of the measures employed in the recovery of persons who are asphyxiated, is necessarily to excite, in every possible way, the suspended function of respiration, and through it, the heart's action, and surely there can be no more direct way of effecting this than to employ insufflation of the lungs, which, as has been shown, rapidly unloads the congested condition of those organs and of the right side of the heart, supplying arterial blood to the left cavities, which will, if that organ be still contractile, immediately be propelled through the arterial system, stimulating the respiratory tracts of the nervous centres, and thus conducing materially to the re-establishment of normal respiration. I cannot, therefore, agree with the committee of the Humane Society in their statement, that the time during which artificial respiration can be applied with a chance of success "is very short, and scarcely more than momentary." On the contrary, it appears to me to be applicable with a likelihood of success, for at least as long a period as any of the other means recommended by the Society; that is to say, as long as the contractions of the heart continue, however feebly they may be carried on. As artificial respiration then unloads the pulmonary artery and the capillaries of the lungs, of the blood that has stagnated in them, and supplies the left side and the substance of the heart with its proper stimulus, red blood, it will, if that organ be still contractile, stimulate it more directly and rapidly than any other means that we are in possession of (for all means will fail so long as the heart, both as regards its cavities and tissue, is filled with black blood); and it cannot, I think, but be looked upon as the most important agent that we can employ in the treatment of asphyxia.

The whole value of artificial respiration, however, depends upon the manner in which it is employed. It will be needless for me to do more than to refer to the memoirs of M. Leroy upon the danger of forcible insufflation, as they are well known to all physiologists, and have already been republished in the reports of the Humane Society for 1832.

The following are the conclusions that Mr Dalrymple deduces from Leroy's experiments.

1st, That inflation of the lungs, when performed with haste and roughness, may be prejudicial to the safety and probable restoration of the patient.

2dly, That if the inflation, though quickly performed, be continued for some time without regularly compressing the chest for the expulsion of the air after each stroke of the bellows, accumulation of air may take place, productive of the same disastrous consequences.

3dly, That, as it is difficult to ascertain, on the first view of an asphyxial subject, in what state of distension the lungs exist, a

forced expulsion of the contained and probably frothy air should in all cases precede inflation.

Valuable as these observations are, yet they do not appear to me to militate in the least against the propriety of the employment of artificial respiration in cases of asphyxia, although they show how necessary it is to be very cautious not to use too great force. We should no more discard artificial respiration in cases of asphyxia, merely because the air-cells may be ruptured if they be unduly and forcibly distended, than we should neglect using the taxis in a case of strangulated hernia, merely because, if improper force be used, the intestines may be burst or peritonitis be excited. The dangers likely to result from the incautious use of an otherwise valuable remedy, ought not to be adduced as an argument against its guarded and judicious employment.

How, then, ought artificial respiration to be employed so as to act safely and effectually? Inflation from the mouth of an assistant is objectionable, as air once respired is not fitted for the support of animal life, and, *a fortiori*, for the resuscitation of the few sparks that may be left in the cases in which it is desirable to employ this means; and this impurity would, I think, fully counterbalance any benefit that might be derived from the increased temperature of the air so introduced,—the usual reason for which this mode of insufflation is usually recommended.

The bellows, if properly constructed so that the quantity of air injected may be measured, are no doubt very useful, and, if furnished with Leroy's trachea pipes, or what is better, with nostril-tubes, may be safely employed by medical men. But the safest, and, at the same time, a very efficient mode of introducing pure air into the lungs is either by means of the split sheet, as recommended by Leroy and Dalrymple, or else by alternately compressing the chest and abdomen with the hand, and then removing the pressure, so as to allow the thorax to expand by the natural resiliency of its parietes; and thus each time it expands to allow a certain quantity of air to be sucked into the bronchi. The quantity introduced need not be large; for, by the laws of the diffusion of gases, if fresh air be only introduced into the larger divisions of the bronchi, it will rapidly and with certainty find its way into the ultimate ramifications of these tubes. This last means of inflation has the additional advantage of resembling closely the natural process of respiration, which is one of expansion from without inwards, and not, as when the mouth or bellows are used, of pressure from within outwards. In one case, the lungs are as it were drawn outwards, the air merely rushing in to fill up the vacuum that would otherwise be produced within the thorax, by the expansion of its parietes; in the other case they are forcibly pressed upon from within, and driven outwards.

It has already been shown, that when the contractions of the

ventricles have once fairly ceased in animals, as determined by laying open the chest, they cannot, in general, be re-excited by any of the means that are in ordinary use. This is in accordance with the most trustworthy observations on the human subject. The question, therefore, necessarily presents itself, are we to leave all those persons who have been asphyxiated, and in whom the action of the heart has ceased, to their fate; and is there no possibility of devising some means by which the contractions of the heart may be re-excited and the circulation renewed? Before attempting to restore the action of the heart it is absolutely necessary to supply its left cavities with arterial blood. The reason of this is twofold. For, in the first place, as the contractions of the heart have ceased, as has already been shown, in consequence of the want of the natural stimulus to that organ—arterial blood—it is of course necessary that this stimulus be supplied before they can be re-excited; and, in the second place, even if the contractions of the heart could be re-excited the circulation could not be renewed with black blood. The only means by which the left cavities of the heart could be supplied with red blood would necessarily be by the oxygenation of that contained in the lungs, which, as has already been shown, can readily be effected even with common air. These considerations induced me to try whether the same object could not more readily and rapidly be accomplished by the introduction of pure oxygen into the lungs; and the cavities of the heart be thus rapidly filled with a highly oxygenized and very stimulating fluid.

With the view of determining this point, I have performed the following series of experiments.

I may premise that the animals had not taken food for from twenty to four-and-twenty hours before they were experimented upon; that they were all asphyxiated by closing the stop-cock of a pipe that had been introduced into the trachea; that the time dates from the commencement of the asphyxia; that the chest was laid open, but the pericardium not, and that the lungs were inflated by adapting a large bladderful of oxygen to the pipe in the animal's trachea; most generally two or even three bladderful of gas were used to each experiment.

I. Experiments in which the heart's action was restored:—

Exp. 15. A mongrel terrier. A soon as the cock was closed the usual phenomena of asphyxia presented themselves. When the pulsations in the femoral artery had ceased to be perceptible the chest was laid open.—*12th minute.* All ventricular action has ceased, there being no tremulous movements even in the ventricles.—*14th minute.* The inflation with oxygen was commenced; it was continued for eleven minutes. At the expiration of this time the ventricles were contracting regularly and distinctly, but feebly, seventeen times in a minute. The auricles were beating about twenty-four strokes in a minute.

Exp. 16. A small mongrel terrier. In a minute and three-quarters after trachea was closed the animal was quiet, all struggles having ceased.—*10th minute.* The ventricles having now ceased all action for more than two minutes, inflation with oxygen was begun.

15th minute. The pulmonary veins and left auricles are of a much brighter red hue, evidently containing florid blood. The inflation was continued till the 25th minute, when it was left off. The ventricles are now acting distinctly and regularly, contracting about twenty-two times in a minute. The auricles are quite still. The contractions appear to be stronger in the right than in the left ventricles.

Exp. 17. A sheep-dog was asphyxiated. The usual phenomena ensued. At the *7th minute* the ventricles had entirely ceased to contract. At *11½ minutes* the auricles were quiet, and at *12½ minutes* inflation with oxygen was begun. At *18th minute* the right auricle was beating forty in a minute. At *25th minute* the ventricles were contracting regularly and distinctly fourteen times in a minute, and on continuing the inflation their action rose to twenty-four.

Exp. 18. A mongrel spaniel. Ventricular action had entirely ceased in nine minutes. At *10th minute* inflation with oxygen was begun. At the *20th minute* heart was acting sixteen times in a minute, very regularly.—*24th minute.*—The ventricles were acting twenty-two times per minute.

II. In the following experiments inflation with oxygen failed to re-excite the contractions of the heart.

Exp. 19. A middle-sized old mongrel terrier. *16th minute.*—All action of ventricles having ceased, inflation with oxygen was begun and continued for nearly twenty minutes without effect.

Exp. 20. A middle-sized terrier. *9th minute.* All ventricular action having ceased, inflation was set up, and continued for a quarter of an hour without effect.

Exp. 22. Small terrier. *6th minute*, after trachea had been closed, heart acting 30 per minute, inflation commenced; animal recovered very rapidly. Tube closed again, and when heart's action had ceased for one minute, inflation recommenced, but without effect.

Exp. 22. Mongrel terrier. *13th minute.* Heart's action had ceased. At the *14th minute* inflation set up without any effect, although it was continued for twenty minutes.

Exp. 23. An old mongrel spaniel. Heart's action ceased in 8 minutes; inflation commenced at the *9th minute*, and continued for 25 minutes without any effect being produced.

In all these experiments, in those in which the contractions of the ventricles were renewed, as well as in those in which they were not, the pulmonary veins and the left auricle were found filled with florid arterial blood; a greater or less quantity of which had also found its way into the left ventricle and coronary arteries;

the pulmonary artery having, also, in all these cases, lost its tension.

In these experiments, then, it was found that, not only after the contractions of the ventricles, but also, in some cases, those of the auricles, had fully and entirely ceased, the action of the heart could be restored by inflating the lungs with oxygen gas. And this, it appears to me, is a result of some importance, as regards the treatment of asphyxia. There can be little doubt but that the revival of the contractions of the heart in these cases was due to the very rapid arterialization of the blood in the lungs, and its passage into the left side and tissue of the heart before the irritability of that organ had become so far extinct that it was unable to contract on the application of its usual stimulus; and that the reason why, by the inflation of the lungs with common air, it is very difficult, if not impossible, to excite perfect contractions of the ventricles, although tremulous movements in them, and proper action of the auricles may be set up, is, that the blood does not become arterialized soon enough to reach the left ventricle, and to permeate the tissue of the heart in sufficient quantity before that organ has lost its power of contracting on the application of this stimulus. It is true, that in several instances in which inflation was set up as soon as the heart's action had ceased, the contractions of that organ could not be restored; the reason of which was not very obvious, though I believe it to be connected with the age of the animal; as I think I have noticed that the contractions of the heart are more readily re-excited in the young than in the old. The number of experiments that I have performed on this subject amounting only to nine, we cannot draw any conclusions from them as to the proportional number of the cases in which recovery is likely to take place; but nevertheless they are fully sufficient to establish the fact, that the contractions of the ventricles may, after they have entirely ceased, be re-excited by the inflation of the lungs with oxygen gas.

Judging, then, from the experiments on animals, the only data that we can safely go upon, I would earnestly impress upon the Humane Society the expediency of giving the inflation of the lungs with oxygen a trial in cases of asphyxia from submersion. I am the more earnest in this entreaty, as this gas had already been found by Dr Babington,* Mr Morgan,† and by a German chemist, to be of use in the asphyxia from the inhalation of carbonic acid; although, in the cases reported, but a very small quantity of oxygen was used, and it was inhaled from a bladder.‡

In ordinary cases of submersion, (those of the first category) in

* *Medico-Chirurg. Trans.* Vol. i. p. 83.

† *Medical Gazette*, Vol. i. p. 94.

‡ *V. de Casper's Wochenschrift*, No. 47, 1843, and *Northern Journal of Medicine* for June 1844. A young man, whilst engaged in some chemical operations, was poisoned with carbonic acid gas; the ordinary means of resuscitation failed, when, on being made to inhale 2½ quarts of oxygen gas, he rapidly recovered.

which the means at present employed are almost uniformly successful, it would be needless, perhaps, to have recourse to this means; but in those desperate cases in which submersion has lasted for more than four minutes, or in which there is no sign of vitality left, and in which, as has already been stated, the measures at present adopted are very generally ineffectual, I would most strenuously recommend the trial of the inflation of the lungs with oxygen gas, more especially as it would not interfere with any of the means at present employed. These are desperate cases, that are now almost necessarily fatal, and that consequently justify the employment of any remedy that holds out a reasonable hope of success.

For the inflation of the lungs with oxygen, however, to be attended with a probability of success, it will be necessary to have recourse to some means by which the introduction of the gas into these organs may be effectually secured, and by which the quantity introduced may be regulated according to the circumstances of the case. A bladder or Mackintosh bag, to contain the gas, is evidently inefficient in both these respects, and has the additional disadvantage of being too small. I have accordingly contrived an instrument, of which the following is a description. This will, I think, be found to answer all the purposes required.

Description of Instrument.

Fig. 1.

- A.* Syringe capable of holding 20 cubic inches.
- B.* Gasometer capable of holding 18 gallons.
- C.* Elastic tube.
- D.* Trachea pipe, or nostril-tube.
- E.* Bath of gasometer.
- F.* Gauge of gasometer.

Fig. 2.

- A.* Piston-rod divided into spaces corresponding to five cubic inches of the syringe.
- B.* Nut sliding on piston-rod, and fixed by means of the screw *b*. The position of this nut regulates the quantity of gas injected.
- C.* Elastic tube ending in trachea pipe, or nostril-tube.
- D.* A connecting piece, by which the elastic tube is adapted to the syringe without untwisting it.
- E.* Flute-key valve of syringe.
- F.* Point of junction of syringe and gasometer.

By means of the nut that works upon the piston-rod, the quantity of oxygen injected may be correctly measured. This, I think, should not exceed fifteen cubic inches in a full-grown adult male, and must be proportionately less in women and young persons. The recent experiments of Mr Coalthupe, which appear to have been conducted with considerable care, prove that the quantity of air taken in, at an ordinary inspiration, amounts to about 22 cubic inches. If, therefore, as it is most desirable in these cases not to distend the lungs, we slowly inject about a third less than this, no danger from rupture of the air-cells need be appre-

hended, and a sufficient quantity of the gas will find its way into the air-tubes to oxygenize the blood rapidly and effectually. In consequence of the great friction exercised by the passage of a gas through a tube a yard and a half in length, the end of which is obstructed by layers of wire-gauze, the oxygen will find its way, but slowly and gently, into the lungs. And whatever be the force employed by the person who works the piston, no sudden distension of those organs can possibly be occasioned. It must be borne in mind, as has already been stated, that in performing artificial respiration there is no occasion to attempt to distend the air-cells; for if air or oxygen be introduced into the air-tubes, it will, by the well-known diffusive property of gases, rapidly find its way into the more remote divisions of those tubes, and arterialize the blood as effectually as if it had been forcibly injected.

The number of inspirations in a minute amount to about 16 or 17. In artificial inflation, however, in whatever way this is done, it is absolutely necessary to compress the chest and abdomen pretty forcibly, each time that a fresh quantity of air has been introduced, as otherwise a dangerous degree of distension of the lungs might be produced; and as it takes some little time to practise this compression effectually, it is scarcely possibly artificially to inflate the lungs more than ten or twelve times in a minute. Taking then the highest estimate, and supposing that the lungs be inflated ten times in each minute, and that at each inflation 15 cubic inches of oxygen be introduced, the quantity injected would be 150 cubic inches, or about two quarts and a half per minute, and an eighteen gallon gasometer would consequently contain enough gas to last for nearly half an hour; at the expiration of which time, the contractions of the heart would probably be restored, if it were possible to re-excite them by this means.

The apparatus that has just been described presents the additional very great recommendation, that by working it with water at a temperature of about 100°, instead of with cold water, the gas may be used warm; which, if we may judge by the analogy of Dr Roesler's experiments on insufflation with atmospheric air, increases considerably the probability of the recovery of the patient.

The chief point then, to be attended to in using this apparatus would be to use but moderate force and a moderate quantity of gas at each inflation,—to empty the lungs before beginning to inflate, and after each inflation, by compressing the chest and abdomen,—and lastly, to work the instrument with warm water.*

* There would be no difficulty in keeping a supply of oxygen at the larger receiving-houses of the Humane Society, in a zinc gasometer capable of holding 60 to 80 gallons, which might be filled when necessary at a most trifling cost; the gas prepared from the peroxide of manganese being quite pure enough for the purpose

There are several subsidiary means, such as electricity, saline injections into the veins, the inhalation of alkaline vapours, &c. the consideration of which need not detain us long.

Electric or electro-magnetic shocks passed through the heart, might perhaps, if conjoined with artificial respiration, or the inflation of the lungs with oxygen, tend to re-excite the contractions of that organ. Indeed, in two or three experiments that I have made on this subject, I have thought that they did aid in restoring the action of the heart, but my observations have not been sufficiently numerous to enable me to speak positively on the matter. I may take this opportunity of stating, that undoubtedly one of the most effective plans of treatment in cases of narcotic poisoning, when complete insensibility has supervened, is, after the stomach has been emptied of its contents, to stimulate by every means in our power the *medulla oblongata* to increased activity, so as to enable the respiratory movements to be kept up in such a way that the blood may be duly aerated; for this purpose we are in possession of no agent at all comparable to slight electric or electro-magnetic shocks passed through the brain and upper part of the spinal cord. This means, to which I believe I was the first to call the attention of the profession in the Medical Gazette for May 1841, is most easy of application, and is most effectual in exciting those portions of the nervous centres to a proper activity, on the integrity of the functions of which the persistence of the respiratory movements depends. Since I published,—three years ago, two instances of its successful application, several cases have been reported in the journals; and I have had within the last twelvemonth another opportunity of testing its efficacy in an almost hopeless case, in which an infant had been poisoned by an overdose of Dover's powder; and in which the ordinary means, such as the cold affusion, ammonia, &c. had failed in arresting the progress of the narcotism.

The injection of saline solutions into the jugular veins have been tried in two or three cases of asphyxia in dogs by Dr Sharpey and myself, but without any beneficial result ensuing. The strength of the solution used was in one case one drachm of common salt and one scruple of carbonate of soda in two pints of water; in another, the same quantity of the saline ingredients to eight ounces of fluid. I have lately heard that this means has occasionally been tried at the Humane Society's receiving-house, but without success. Indeed, from the pathology of asphyxia, it could scarcely be expected to succeed.

It has likewise been very ingeniously suggested by Dr C. J. B. Williams, that the employment of baths containing pure alkalis, or the chlorate of potass, might in some cases of asphyxia be attended with success; but I think, for reasons that have already in question. It is needless to add that the management of the apparatus should be entrusted to none but a medical man.

been given, that more advantage would be derived from the free exposure of the surface to the vivifying influence of atmospheric air, than from the immersion of the body into any kind of bath.

It is not my intention to speak of the treatment required in other kinds of asphyxia, as in that from hanging, from the exposure to noxious gases, &c., as the directions of the Humane Society appear to me to be exceedingly judicious on these points. I may, however, state, that the very great utility of the inflation of the lungs with oxygen gas, which has already been demonstrated in the latter variety of the disease in the instances referred to, is an additional argument in favour of its employment in asphyxia from submersion.

The propriety of bleeding in cases of asphyxia depends of course upon the tendency to congestion in the head or chest after the heart's action has been fully restored, and can easily be judged of by any medical man. Care must, however, be taken not to abstract more blood than is absolutely indispensable, so that the already diminished powers of the system may not be still further exhausted by a greater loss of blood than necessary.

The danger of the supervention of secondary asphyxia after recovery has apparently taken place is now well known to all medical men, and there is, consequently, no occasion to dwell upon this part of the subject. It may, however, be stated in general terms, that the utmost care must be taken to maintain the restored actions, by keeping the patient as quiet as possible, and by attentively guarding against all causes of excitement, mental as well as bodily, that can in any way embarrass the action of the heart or respiratory organs. With this view the patient must not be allowed to walk or to make any exertion for some time after he has been apparently recovered. And if the asphyxia has been the result of an attempt at self-destruction, we must, in addition, endeavour to soothe and quiet the mind of the unfortunate sufferer.

Should symptoms of secondary asphyxia, such as stupor, laboured respiration, dilatation of the pupils, and convulsions, manifest themselves, artificial respiration should be immediately set up, and be maintained until the action of the heart has been fully restored. In these cases I should, from the very great efficacy of electricity in the somewhat similar condition resulting from the administration of the narcotic poisons, be disposed to recommend slight shocks to be passed through the base of the brain and upper portion of the spinal chord, so as to stimulate the respiratory tracts.

There are yet several points in the pathology as well as in the treatment of asphyxia, the investigation of which I had proposed to myself, but the natural repugnance that one feels to the sacrifice of animal life, however useful may be the end that is to be obtained, has induced me to relinquish my original intention.

ART. II.—*On the Period of Puberty in Esquimaux Women.*

By JOHN ROBERTON, Manchester.

OPPOSITE to Cape Bauld, the most northerly point of Newfoundland, across the Strait of Belle Isle, lies the dreary Atlantic coast of Labrador,—a coast which, commencing in latitude 52, stretches (so vast is the extent,) in a north-westerly direction, presenting a rampart of naked rocks to the fury of the ocean, until it terminates ten degrees higher at Hudson's Strait.

This, without exaggeration, may be considered one of the most inhospitable regions of the globe. The shore guarded by numerous islands, and penetrated by bays, consists of little besides bold masses of splintered rocks, in many parts rising above the sea to an astonishing elevation. The country in general, instead of grass, is covered with the rein-deer moss; while at the heads of the bays, and in some of the valleys are found a few pines, and several kinds of stunted arctic trees and shrubs. Everywhere streams, lakes, and ponds abound, which swarm with fish, as does likewise the neighbouring sea; and the shores and islands are the greatest resort known of the various animals belonging to the seal tribe.

The climate is acknowledged to be one of the severest, the reign of winter continuing with but little intermission three-fourths of the year; when streams, lakes, bays, and sea, are alike bound in ice; and the snow is reported by the missionaries as being sometimes twenty-four feet and upwards in depth. As evidence of the intenseness of the cold, the thermometer not unfrequently sinks to 30° below zero.

The native inhabitants consist of Esquimaux, who, here, as wherever they are found, frequent the sea-board, and a few families of miserable Indians, which hunt in the interior. As the physical characteristics of the Esquimaux, to which race my remarks are to be confined, have been treated in a former paper, I need not again at present particularly advert to the subject. This people on the Labrador coast, formerly thievish, blood-thirsty, and deeply degraded, are described as still "barbarous," although no question, by the labours of the missionaries, they have, in a very remarkable manner, been brought under the civilizing influence of the Christian religion.*

Opposite Newfoundland, and even for two or three degrees of latitude farther to the north, the coast of Labrador is studded with

* "The natives are a race closely resembling the Greenlanders, and speaking a dialect of the same language. Their name, Esquimaux, was derived from their neighbours and inveterate foes, the Northern Indians, in whose language "Eskimausik," is said to signify "eaters of raw flesh." They are a barbarous, and were formerly a savage and truly benighted race."—*Missionary Intelligence of the United Brethren*, 1843.

English settlements established for the purpose of catching and curing fish. But it is still northward of these, in regions wholly resigned to the Esquimaux, that we discover those celebrated stations of the Moravian or United Brethren, the fruit of a benevolence and a heroism which have never been surpassed, if equalled, in the records of the Christian church. The first attempt, in 1752, to establish a mission, was frustrated through the murder of the leader of the party, Erhard, and several more, by the natives, for the sake of their property; but this, instead of deterring, only stimulated to fresh attempts, which, after great discouragements and checks encountered with unflinching resolution during a number of years, resulted in the formation of the settlement of Nain, in latitude $56^{\circ} 36'$, an event that happened on August 9, 1771. In course of time three additional stations were formed, which have brought the missionaries in contact probably with the whole of the Esquimaux on the Atlantic coast, namely, Hopedale, in $55^{\circ} 40'$, Okkak, in $58^{\circ} 20'$, and Hebron, within Hudson's Strait, in 61° .

Having long been desirous of ascertaining the age of puberty in the Esquimaux, it struck me, that, as I had succeeded so well by the instrumentality of the Moravian missionaries with reference to an inquiry among the negroes in the West Indies, I might be equally fortunate, by the same means, on the coast of Labrador, particularly as the missions here had been in existence for upwards of seventy years, and possessed, as is everywhere the case at the stations of this society, registers of births or baptisms. Accordingly, seconded by the influence of a most intelligent director of the Moravian Missionary Society in London, to whose kindness for the aid rendered I am deeply indebted, I transmitted my inquiries by the annual ship, the *Harmony*, which, for seventy-four summers in succession, has made a voyage to and from the stations in Labrador. This was in the spring of 1843, and I was told not to look for a reply till the return of the *Harmony* after another voyage, in the autumn of the present year, 1844. The reply in question I have now had the satisfaction of receiving. It is in German, dated Nain, December 12, 1843; and is the production of the Rev. John Lundberg, Superintendent of the Missions. The uncommon neatness and beauty of the penmanship, as well as the value of the contents, proves that, though written in the gloom of an arctic winter, it is the production of a mind whose energies are in no degree depressed by the influences of so remote, cheerless, and barbarous a residence. The following is a translation made for me by a Moravian professional friend conversant with the German language.

“RESPECTED SIR,—In order to comply with your request, and to furnish a faithful report, I was under the necessity of wait-

ing till the beginning of winter, when our Esquimaux are assembled around us. I trust the following tables will correspond with the object of your inquiries. I could adduce instances of several women under the age of 14, in addition to those in the table, with whom the menses have not appeared.

No. of Esquimaux women.		Age at present.		Age when the menses first appeared.	
1	-	16	-	16	In our register.
2	-	21	-	17	
3	-	43	-	14	
4	-	14	-	Not yet.	
5	-	20	-	14	
6	-	35	-	14	
7	-	15	-	15	
8	-	32	-	17	
9	-	18	-	17	
10	-	39	-	14	
11	-	38	-	20	
12	-	13	-	Not yet.	
13	-	24	-	15	
14	-	17	-	16	
15	-	31	-	20	
16	-	12	-	Not yet.	
17	-	23	-	15	
18	-	17	-	16	
19	-	13	-	Not yet.	
20	-	14	-	Do.	
21	-	17	-	15	

Q. At how early an age have you known an Esquimaux give birth to a child?

A. Fifteen and three-fourth years.

Q. What is the earliest age at which you have known a female marry?

A. Fourteen years.

Q. What is the common age of marriage at present?

A. From 17 years and upwards,—not much earlier.

Q. What was the age when the natives were in a state of heathenism?

A. In a state of heathenism the girls were occasionally married, if the body were large grown, as early even as in their tenth year; the occurrence of puberty was never inquired about. Some men took two, three, four, and even five wives; one always younger than the other, but not at the same time. When a man had had the first wife one or two years, he took a second, and so on until he possessed as many as he could or would maintain.

Q. What is the most advanced age at which you have known a native woman give birth to a child?

A. The greatest age at which a woman has borne a child is,

according to the register, 44½ years; there are several others at 41 years.

Q. To how late a period of life does menstruation continue?

A. A woman, now 66 years of age, menstruated till in her 54th year. She, however, never had a child, but was troubled at times with hæmorrhage for a month together.

Another, 48 years of age, still menstruates.

Experience in general teaches us that the Esquimaux women are not unfruitful, as was supposed formerly while they lived in a state of heathenism. This may have arisen from the fact that many heathen women produced abortion by very powerful means, which is not the case with those who have been converted to Christianity. With the heathen also it was not unfrequently the case that infants of the female sex were laid upon the rocks as food for the ravens and foxes.

The following table will show the fruitfulness of the Esquimaux women.

Women.		Age at present.	Children.	
1	-	61	had	8
2	-	59	...	9
3	-	54	...	7
4	-	46	...	8
5	-	41	...	9
6	-	64	...	7
7	-	54	...	10
8	-	42	...	8
9	-	32	...	6
10	-	30	...	5
11	-	31	...	5
12	-	33	...	7
13	-	36	...	6
14	-	33	...	6
15	-	34	...	4
16	-	27	...	3
17	-	33	...	5
18	-	32	...	4
19	-	21	...	2
20	-	32	...	4
21	-	48	...	12

Menses have
ceased with
these persons.

These persons
still menstruate.

Among sixty-six women there are only two who have had no children.

The following may also deserve some attention. Although the Esquimaux are by nature very plethoric (*full of blood*), causing frequent bleeding at the nose, a woman who suckles her child seldom menstruates, if not longer than one or two years intervene before she again becomes pregnant. I am acquainted with some who have never menstruated since the time of their first pregnancy, although they have borne eight or nine children.

We observe with regret that the now more frequent use of European provisions, as bread, flour, pease, &c. acts injuriously on the solid bodily constitution of the Esquimaux. They become weaker, and are attacked by several diseases which were formerly quite unknown in Labrador. Hence also parturition is more frequently difficult.

Should the above observations satisfy your wishes, it will afford pleasure to your obedient servant,

JOHN LUNDBERG."

The first remark I have to make concerning this valuable document—valuable both for the care with which the matter has been collected, and the novelty of the facts—is, that, had I not in my communication to Labrador requested that, in any table which might be furnished respecting the period of puberty, the instances inserted should be restricted to those whose ages could be authenticated by the mission register, I should probably have obtained a larger, but certainly not a more trustworthy body of information.

And I may here also advert to the object I had in view in instituting the inquiry as it respects the Esquimaux; it was to determine what truth, if any, there may be in either of the two directly opposite opinions which have been maintained regarding the age of puberty in this race of people; the one broached by Haller, and which still generally prevails, that while in warm climates women reach puberty at the ages of 9, 10, and 11, and, in the temperate zone, in the next four or five years, the same does not happen in high northern latitudes *till the age of 18 or 20*; and the other, advanced by the Baron Humboldt, that the very early puberty of the Indian women of South America, as to which he testifies, is *in the copper-coloured race*, and not owing to the warmth of the climate,—a fact proved by the same being true of the Esquimaux, and, in Asia, of the Kamscadales and Coriaks, where girls of ten years are often mothers.* Both opinions of course cannot be correct, and the reader will be able to judge if there be truth in either.

It will be seen that though the table concerning puberty in Mr Lundberg's letter contains twenty-one entries, in five of these, namely, one woman aged 12, two aged 13, and two aged 14 years, menstruation had not begun; leaving sixteen only whose ages at the menstrual period are given, and these offer the following results:—At the age of 14 four Esquimaux began to menstruate, at 15 four, at 16 three, at 17 three, and at 20 two; the average age for the sixteen being $15\frac{1}{2}$ years.

On considering how this result might, in a satisfactory manner, be compared with data as to the period of puberty in England, I

* Travels in the Equinoctial regions of America, &c. Vol. iii. page 233.

adopted the following method :—having by me three parcels of sheets containing entries of the ages at which menstruation occurred in 450 instances, collected by two friends, Mr Clough and Mr Gee, and myself, in the year 1829, I took from each of the three parcels (for each was known by its being in a different handwriting), the first sixteen entries; and now subjoin them along with the sixteen Esquimaux instances in this tabular form.

Age.	From Labrador.	By Mr Clough.	By Mr Gee.	By myself.
11	—	—	2	—
12	—	—	—	1
13	—	—	2	2
14	4	2	—	5
15	4	5	3	3
16	3	3	2	2
17	3	4	5	1
18	—	—	2	2
19	—	2	—	—
20	2	—	—	—
	16	16	16	16
	Average age 15½ years.	Average age 16½ years.	Average age 15½ years.	Average age 14½ years.

Thus it appears that when brought to the test of this kind of comparison, the fairest I could think of, there is no difference, certainly no striking difference, between the age of puberty in the *Esquimaux* and in the women of our own country; neither later, owing to rigour of climate, nor earlier, owing to race. It is true there are no instances in the column for Labrador of menstruation occurring under the age of 14; but, on the other hand, as a counterpoise, it must be noticed that *half* the sixteen *Esquimaux* menstruated under 16 years of age, while, with respect to the three English columns of figures, this can be said of one of them only. When this fact is considered, in connection with the answers to several of the queries, only one conclusion remains, namely, that for anything which appears in this document, the age of puberty in Labrador is the same as in our own climate.

To advert to the answers to two of the queries; for example, when to the query (5), with respect to the earliest age at which an *Esquimaux* woman has been known to bear a child, the answer is 15½ years, it must be evident, considering the scanty population amongst which such a birth occurred, that this really is an *early* instance of maturity and fruitfulness; and that probably, in a population ten times the number of the *Esquimaux* of the mission stations, not one at an equally early age would have been forthcoming, had the query been put, suppose, to the clergyman of a considerable parish in England. Then, moreover, there are indirect, and, on that account, extremely valuable proofs to the

same effect, arising from the age at which the catamenia cease ; for from the reply to query 6th, and facts which the reader will notice in the table showing the fruitfulness of the Esquimaux, it does not appear that the women of Labrador continue to menstruate *later* than is usual in England. The answer to this query states that one woman has been known to menstruate till 54, and that another aged 48 still continued to menstruate ; again, in the table referred to, two women of the respective ages of 41 and 46 are set down as past the menstrual period of life—facts which are strictly in accordance with the experience of English women. Were it, however, generally true that puberty is later in the case of the Esquimaux, the period for the cessation of the catamenia would, of course, also be generally later.

But even had we more data than this document supplies as to the age of puberty in the Esquimaux, and did it incontestably appear that examples of menstruation at the ages of 11, 12, and 13 years are proportionably fewer than in England, this would probably not prove anything in favour of the effect of climate in retarding puberty. The retardation, if any, would perhaps be attributable to the same class of causes which, in the West Indies, was found to render instances of retarded menstruation not unfrequent in the negress. It may be recollected by those who have read a former paper on the period of puberty in the negro, that Mr Nicholson, after an experience of twenty years in the island of St Vincent, never knew a negress nor a white woman who menstruated before the twelfth year, and but seldom at that age, a statement agreeing with the returns, respectively, of Messrs Zorn and Elliott, as to the blacks of Jamaica. In addition, he mentions the important fact, that cases of retarded menstruation, from chlorosis, are more common in the negress than in whites, not from any constitutional difference in these races, but from unfavourable physical circumstances affecting the former. Now it is likely that the same remark might equally apply (did facts require such explanation) with regard to Esquimaux as compared with English women, exposed as the Esquimaux are to every kind of vicissitude of weather, to deficient shelter in wretched huts, and a diet often innutritious, and still oftener scanty.

Mr Lundberg's letter corroborates what I have had repeated occasion to mention in former papers, concerning the early age of marriage amongst this race.* He states that girls of ten years, if large-grown, were formerly (in the state of heathenism) taken to wife, and of these a plurality—not a plurality at once, but taken in succession at short intervals ! Well does this detestable trait of manners justify what has been incidentally remarked by Sir John Ross, with reference to the Esquimaux of Boothia Felix,

* See Edin. Med. and Surgical Journal, vols. for 1832 and 1842.

that their conduct "is not more pure than that of the brute beasts: it is far less so than that of the pairing animals."*

I may here add, that early marriage prevails at the southern extremity of America, amongst the natives of the cold and desolate Archipelago of Terra del Fuego, just as it does amongst the Esquimaux, of which we are furnished with various proofs in the surveying voyages of the *Adventure* and *Beagle*.† Thus, Captain Fitzroy says, "The Fuegians marry young,"‡ and we are incidentally enabled to judge of the age at which this occurred in, at all events, one instance. Amongst certain Fuegian savages, brought to England by Captain King, was a girl named Fuegia Basket, captured near Beagle Channel, south latitude 55°, and said to be nine years of age. On carrying these persons back to their own country three years subsequently, a Fuegian of the party evinced a partiality for this girl. At length they were safely landed, and the narrative states that the couple, on the departure of the ship, were living together as man and wife, although it appears the female could not have advanced beyond her thirteenth year.§

The fecundity of the Esquimaux, judging from the latter of the two tables in Mr Lundberg's communication, is remarkably great, being $6\frac{2}{3}$ children to each woman. And the other piece of information appended to the table, namely, that out of 66 women (married women no doubt), only two had failed to be mothers, assuredly could not be paralleled in England, where a rather considerable proportion of those who marry (I am not acquainted with data by which the exact proportion may be determined) do not produce children. It being, however, foreign to my object to enter upon a discussion concerning the comparative fruitfulness of Esquimaux and English women, I will not attempt to pursue it; satisfied with having called attention to the facts, which are certainly curious, and toothers they will be, as they have been to myself, of a nature quite contrary to what, from our previous knowledge, might have been expected.

What Mr Lundberg reports as to the effect on the bodily health and vigour of the Esquimaux, caused by the substitution in part, for the fish and animal food of which their diet formerly almost exclusively consisted, of wheaten bread, pease meal, &c. will be interesting to the student of organic chemistry, the principles of which explain why in cold regions animal substances are the pro-

* Sir John Ross's Appendix, 4to, page 7.

† Published in three vols. 1839.

‡ Ibid. vol. ii. page 182.

§ The Patagonians, an equestrian people, who range over the country near the Straits of Magellan, according to Captain Fitzroy of the *Beagle*, marry early; the men at the age of 20, while the girls are considered "marketable commodities" at from 14 to 16. Vol. ii. page 152.

per food of man, and between the tropics, substances taken from the vegetable kingdom. The correctness of a remark of this intelligent missionary, that it is to the above change in diet the greater difficulty now experienced in parturition should be ascribed, may well be doubted. More likely the moral changes, introduced by education and religious teaching, which have raised the natives from a state of animal nature to the rank of thinking beings, are producing the usual effect upon the female constitution,—that of rendering it more irritable; and, as a thing of course, interfering somewhat with the perfect performance of the organic functions of life. Such an effect from such causes was inevitable. The Esquimaux now have joys and sorrows, hopes and fears, desires and disappointments like ourselves, and the consequences on the bodily constitution are doubtless the same, in kind if not in degree, as in older civilized communities.

It may not be improper, in concluding, to intimate that investigations, as to the age of puberty and other particulars having relation to this point are now, I have reason to hope, being made for me in various quarters, and amongst different races, especially in India; and that it is my intention to publish the results, as they may from time to time reach me; believing that this, upon the whole, is the best course I can pursue with a view to the elucidation of the present subject of inquiry—a subject as to which the mind of the profession is so strongly biassed that no great favour is to be expected (nor is it by me desired) for the opinions I have been led to maintain, until they are presented, as I trust they will be, based on an induction of facts sufficient in respect both to their number and their diversity, and collected with a degree of care and caution necessary to secure confidence in them.

ART. III.—*Cases of Diabetes, with Observations, shewing the influence of a warm climate in the cure of that disease.*

By KEITH IMRAY, M.D., Fellow of the Royal College of Physicians, and Licentiate of the Royal College of Surgeons in Edinburgh.

FEW diseases have been investigated with more attention than diabetes; but though, of late years, the researches of scientific chemists have made us more intimately acquainted with its nature, the various modes of treatment hitherto employed have been found of little avail in this country; for the proportion of fatal cases is still so great that Dr Copland calculates the chances to be five in six, or even higher, against the patient. The variety in

the treatment has no doubt arisen in a great measure from the numerous theories which have been formed to explain the proximate cause of this obscure disease; many remedies have also been tried on no other ground than that those previously employed had failed. But the almost constant fatality of diabetes, even in the hands of the most experienced medical men, and under the most favourable circumstances, clearly demonstrates that, in our cold and moist climate, there are no means of cure, however well conducted, on which much reliance can be placed.

None of the remedial means which have been proposed appeared so likely to insure success as the exclusive use of animal diet, which was first suggested by Dr Home of Edinburgh, and afterwards strongly advocated by Dr Rollo and many other distinguished medical men. But this method of treatment has lost the high character which it once held. Though there can be no doubt that it produces the effect of diminishing the quantity of urine, and rendering it less saccharine, yet it can only be considered as a powerful means of palliating the disease; and, in this respect, it is of great value, and must ever be considered as indispensable in the treatment of every case in which sugar can be detected in the urine. Whether a permanent cure could be accomplished by a long continued use of animal food alone cannot easily be ascertained, for few patients have sufficient self-control to allow them to continue this diet for any length of time; the craving for bread and other vegetable substances, and the disgust to animal food, become at last so great, that it is questionable whether or not any patient has ever been known to confine himself long to its exclusive use. In some instances a strict adherence to animal diet has been known to produce fever and local inflammation.

Dr Watt's treatment by blood-letting never raised such high expectation of success as that of Rollo. Few medical men would be found willing to bleed to any extent in a disease which presents, throughout its whole course, so many symptoms of debility; and probably no one has ever carried depletion in diabetes so far as Dr Watt himself. There can be no doubt, however, that venesection is useful at the commencement of the disease; but it requires to be carefully regulated according to the strength of the patient, the fulness and firmness of the pulse, and other circumstances of the case. Much benefit has also been derived in many instances from cupping over the loins, when pain has been felt in that situation; and the repeated application of leeches over the epigastric region has been found to give much relief when pain and heat have been experienced in the region of the stomach.

Opium, if given in large doses, determines strongly to the skin, renders the thirst less urgent, and diminishes the quantity of urine, while it calms the uneasiness and the mental anxiety of the pa-

tient; but as soon as this remedy is discontinued the original symptoms return. In using opium for any length of time, it is always found necessary to go on increasing the dose, and if the patient survive he is likely to become a confirmed opium eater. This is a serious objection to the employment of opium; but, it must be admitted, that, next to the use of animal diet, it is the best and most certain means of ameliorating the symptoms.

The employment of diaphoretics is naturally indicated by the morbidly dry and harsh state of the skin, which is certainly one of the most constant and remarkable symptoms of diabetes. Dr Prout, in his valuable work "*On the Nature and Treatment of Stomach and Urinary Diseases*," states* that it is sometimes absent; but such cases, I suspect, must be comparatively rare. A more or less disordered condition of the cutaneous function is perhaps as uniformly met with as the saccharine state of the urine. I have seen three cases of *diabetes insipidus* in hospitals, but have never met with a case of the disease, in any form, where the skin was not affected. Dr M'Gregor† remarks that patients frequently die, having all the symptoms of diabetes, without the least trace of sugar in the urine. Two well-marked cases of this form of the disease came under his own observation. Some authors reject the appellation of diabetes when sugar is not found in the urine; but it appears to me to be strictly applicable when the usual symptoms of the disease are present, viz. an increased appetite for food, great thirst, suppression of the cutaneous discharge, an excessive flow of urine, and emaciation. This form of the disease is widely different from a mere increase in the quantity of water discharged from the urinary organs, a morbid condition which has been frequently confounded with diabetes, although they possess nothing in common except the increased discharge of urine.

The greater part of the cases of diabetes on record appear to have proceeded from suppressed perspiration, or some cause acting upon the skin and disordering its functions. The suppression of the cutaneous discharge is generally one of the earliest symptoms observed, and it has invariably been remarked, that, whenever the disease begins to give way, the first symptom of amendment is a change in the state of the skin, which, from being rough, parched, and sometimes scaly, becomes soft and moist, and that the diminution of the quantity of saccharine urine always keeps pace with the progress of the skin towards a healthy condition. The knowledge of these facts, and the failure of Dr Rollo's treatment, have caused the use of diaphoretics to be strongly advocated by some writers; while many again, although they have not overlooked the dry state of the skin, which might naturally have

* At page 31.

† See Medical Gazette for May 1837.

suggested the employment of remedies of this class, do not appear to have had recourse to them. There can be no doubt that this disease, in many cases, has been much mitigated, and in some instances removed, by means of diaphoretic medicines conjoined with the use of the vapour bath or bathing in warm water; but in this variable climate little confidence can be placed in any means resorted to with the intention of keeping up a constant action on the skin; and, unless this can be effected, we can only expect a temporary benefit from the sudorific treatment.

Dr Christie,* finding diabetes a much more manageable disease in Ceylon than it has proved in this country, proposed the employment of an artificial temperature. He says, "The warm and uniform temperature at Columbo, where Fahrenheit's thermometer rarely sinks below 70°, or rises above 86°, may have contributed essentially to the favourable termination of the cases of diabetes treated there. Might not an artificial temperature, which has of late been successfully used in Great Britain in pulmonary complaints, be also employed with advantage in diabetes?" But to confine a diabetic patient to a warm room would tend to increase the languor and despondency which always accompanies the disease. I think diaphoresis might be more advantageously promoted by warm clothing, and riding on horseback, walking, or any other kind of active exercise in the open air. But the great difficulty consists, not so much in making the patient perspire occasionally, as in keeping up constantly a relaxed and perspirable state of the skin. Now the constant action of the warm atmosphere within the tropics is more likely to restore and to maintain the natural secretion from the skin than any other means whatever.

In diabetes the entire animal economy is disordered; indeed there appears to be a disease of the whole system. Now many remedial agents, mercury for example, will produce marked changes upon the system; but none will be found more certain or so permanent in its action as a tropical climate, the influence of which is unceasing in exciting the cutaneous discharge; and it is certain that there can be no great excess or deficiency in this important excretion without the general system being proportionably affected.

In warm climates, where the skin is constantly in a relaxed and moist state, diabetes is a rare disease. Dr William Hunter, during a long residence in Bengal, never saw a case there. Dr Copland mentions that he has seen two cases of diabetes in negroes, but he does not state whether he met with them in this country or within the tropics; and even when it does occur in warm climates, Dr Christie has shown that it is decidedly more under the influence of treatment than in cold countries. Dr Prout is of opinion that malaria has considerable influence as an exciting

* See the *Edinburgh Medical and Surgical Journal* for July 1811.

cause of diabetes. If this were the case, we might expect it would be a common affection in tropical countries where malaria abounds. During seven years of extensive practice in the West Indies, where malarious diseases were the chief cause of the mortality, I never saw or heard of a case of diabetes from that or any other cause. If living almost entirely on rice and other articles of vegetable food were the principal cause, it ought to be a disease of frequent occurrence in the East Indies, where the greater part of the inhabitants are restricted from the use of flesh as food, and are also often subjected to the full influence of malaria.

There can be little doubt that diabetes is chiefly confined to cold countries, and that the ordinary exciting cause is long-continued or repeated exposure to cold and moisture; the first impression of the disease being made on the skin, and producing derangement of its functions. But we know that many people are constantly exposed to cold and moisture, and that diabetes is far from being a common disease, although other maladies arising from the same cause are of every-day occurrence. We are, therefore, obliged to infer that a predisposition to diabetes must exist; but it is quite impossible to ascertain in what this predisposition consists. Who can explain the condition of an organ when predisposed to a particular disease, or the nature of the essential changes which it undergoes, to cause a perverted action of its function? We may expect the pathologist to answer such questions when he is able to unfold the nature of the operations of the living body in a state of health. The experiments of Dr M'Gregor are conclusive in shewing that sugar, instead of healthy chyle, is formed in the stomach from animal as well as from vegetable food, and that it is conveyed into the circulation, and is found in all the excretions of the body; but the perverted action of the stomach on every kind of aliment received into it, and its refusing to assimilate sugar when used as an article of food, has not been accounted for; neither can we explain why diabetes sometimes runs its course to a fatal termination without the urine ever becoming saccharine. These are problems which I willingly leave to abler pathologists to solve. I have no theory to propose, no hypothesis to maintain, and shall be satisfied if the publication of the following cases, with the few observations I have thought it necessary to make, shall aid in advancing a step towards the end of saving a greater number of patients from this dangerous disease.

CASE I.—While practising at Dominica in 1828, Mr J. L. placed himself under my care in the month of March, and gave the following account of his case.

Two years previously he caught a severe cold during winter, and it would appear he had suffered from bronchitis during several months. His general health gave way, and from being very robust, and inclined to corpulency, he became considerably reduced in weight. He began to get better in spring, and in summer was quite well, although he did not find himself so strong as before his illness. In the following winter he was again attacked by bronchitis, which, he believes, was brought on by travelling with his feet wet on the top of a coach. When the affection of his chest was beginning to leave him, he began to suffer from constant thirst ; and his appetite was very keen, while his skin gradually became dry and rough, and, to use his own language, " the sweet urine came on." It does not appear that he followed any regular course of treatment ; he was so much better at times as to be able to attend to his business, which he could manage within doors. He passed, he believes, from twelve to twenty pints of urine daily, according to the quantity of food and drink he took. He arrived from England in last December. During the passage out he suffered severely from sea-sickness, which, he says, made him perspire freely, and his urine was greatly diminished in quantity. He got better daily from the time the sea-sickness commenced, and on his arrival thought himself nearly well ; and in January, he says, his complaint had quite left him. It appears probable, however, that his urine had remained more or less saccharine. A fortnight ago he returned home late at night, having travelled some distance, and got wet by the way. He was seized with fits of shivering, and was feverish for some days afterwards ; his skin became dry, his thirst urgent, and, in a word, all the former diabetic symptoms returned ; and finding himself unable to attend regularly to his business, he thought it necessary to apply to me.

He is of middle size, fair complexion, with dark hair and eyes ; he weighs eleven stone and a half, but had been at one time considerably heavier. His skin is dry, and somewhat rough, his bowels are constipated, gums red and spongy ; his thirst is constant, and appetite great, though not so keen as when he was ill in England ; pulse 80, and soft ; urine tastes sweet, is clear, of a straw colour, with a faint smell of violets, and the vessel containing it is surrounded by swarms of flies, attracted, no doubt, by the sugar contained in the urine. This last circumstance alone, he says, is quite sufficient to convince him that his urine is as sweet as when he was in England. He admits that he had been in the habit of drinking very freely at times when at home, and he tells me, with some reluctance, that he now drinks nearly half a bottle of rum or brandy, with cold water, daily, which, he says, never affects his head.

I prescribed a full dose of castor oil, and instructed him to live almost entirely on animal food, and to give up drinking spirits. He is to notice carefully the quantity of urine he passes in twenty-four hours.

March 8th. Castor-oil operated freely ; has voided nineteen pounds of urine since yesterday ; was obliged to get up twelve times during the night. He appears much depressed to-day, says he has

always been accustomed to drink malt liquor or spirits, and that he cannot do without something to keep up his strength. He is obstinate on this point, but says he will not take more than a glass of brandy a-day.

To have fifteen grains of Dover's powder every night at bed-time, and ten grains, in two doses, daily; and to have his bowels kept open with castor-oil.

12th. He has taken the Dover's powder regularly, but it has produced no effect upon the skin, nor has he slept better; passes nearly the same quantity of urine, which ferments from the heat of the climate on being kept a night. He breakfasts on salted cod fish, dressed with oil or butter, (a common dish at this meal in several of the West India colonies,) and takes with it only a small roasted plantain, or part of a cassada cake*; dines on mutton, pork, or chicken, with a little cassada or bread. His appetite is still very keen, and thirst urgent; he still attends occasionally to his business.

He is ordered to have two grains of tartar-emetic in a pint of water, to be taken in the course of the day, and continued daily. Dover's powder to be discontinued.

25th. The weather has been wet and unfavourable, and the evenings cold; ague and dysentery are prevalent; my patient considers himself worse; his urine has not diminished in quantity. His servant informs me that she found a quantity of the skins of the banana in a drawer in his bed-room. I cautioned him particularly some time ago not to eat this fruit, as it contains a large proportion of sugar. On being questioned, he confesses that he has been in the daily habit of eating bananas; but as he has found that they have done him harm, he has promised faithfully to avoid them in future. I have advised him to go to Souffrier, which is situated at the south-western side of this island, and is a more healthy situation than where he now resides; it is more dry, and the temperature, though some degrees higher, is very equable. I have also told him to bathe daily in the warm sulphurous water, which proceeds from a volcano not far from the village of Souffrier. As I shall not now be able to see him so frequently, I have warned him of the consequences of disobeying the instructions I have given, and insisted on the necessity of paying more attention to his diet, and of the risk he runs from drinking spirits as he has been in the habit of doing.

April 4th. The weather has been dry, and the temperature high. He has bathed regularly, and has taken very little vegetable food; he still continues to eat fish for breakfast. The quantity of tartar-emetic has been gradually increased to four grains a-day, which has caused occasional vomiting. His urine yesterday was only ten pounds, and he is in much better spirits.

12th. His urine has been gradually diminishing in quantity, and yesterday he passed only about six pounds. He has been walking a good deal, which has caused perspiration to break out occasionally

* This useful article of food is prepared from the root of the *Iatropha manihot*, deprived of its poisonous juice, and dried over the fire.

on his forehead. Last night he perspired considerably, and feels much lighter; he is stronger, and can take more exercise than formerly. He now takes only two grains of tartrate of antimony in the course of the day; he is not disturbed so frequently in the night, and sleeps soundly. The state of his bowels obliges him to take castor-oil occasionally.

20th. The cuticle begins to peel off from various parts of his body; the thirst is greatly diminished,; gums still red, but not so spongy, nor do they ulcerate from any slight friction as they did a few weeks since. His appetite is more moderate; he now drinks beer diluted with water, and has altogether given up the use of spirits. Urine during the last twenty-four hours did not exceed four pounds; on testing it with yeast it was found to ferment slightly.

25th. He now perspires freely, and the prickly-heat (*lichen tropicus*) has broken out very plentifully on his body and limbs; the urine is now nearly natural in quantity, and has the odour proper to that excretion; it is no longer sweet to the taste, but testing it by yeast, shows that it is still slightly saccharine. He has taken the tartar-emetic regularly since he first began to use it, varying the quantity from one to four grains daily. At present he only takes one grain. He bathes daily in the sulphurous water.

30th. His general health is now greatly improved; he begins to gain flesh, and continues to perspire, to use his own expression, "like other people." His urine does not now exceed the normal quantity; it shows from time to time a lateritious sediment, but yeast no longer detects the presence of sugar. The prickly heat still continues troublesome, but he says he has felt himself getting better every day since it first made its appearance. He has ceased taking the tartar-emetic, and uses no medicine of any kind except castor oil occasionally when he finds it necessary. He bathes every day in the sea, and is fond of swimming; the water near the shore is tepid. He takes exercise in the open air at all hours of the day, and uses very little vegetable food. This patient remained in the island upwards of twelve months longer without any relapse, and returned to England in good health.

The next case of Diabetes that came under my charge was at Edinburgh in the spring of 1835.

CASE II.—Mr F., aged 25, is of a spare habit of body, weighs eight stone two pounds; his complexion is fair, eyes blue, with a suffused appearance; his countenance presents an anxious careworn look. His occupation is that of clerk to a writer to the signet; but he states that his health has been declining during the last two years, and in consequence he has not been able to attend regularly to business for some time past. He had a severe attack of pleurisy three months ago, and was bled profusely; since then he has felt weak and easily exhausted on taking exercise; he has become peevish and irritable, and is very low-spirited at times from trifling causes. He eats voraciously, and has been much troubled with thirst; drinks several bottles of weak bitter beer, in

a state of effervescence, daily, and takes large draughts of cold water repeatedly during the night; is generally constive, and complains of occasional pains in the stomach and bowels, and has been frequently troubled with acid eructations; his gums are tender and spongy, and bleed from the slightest friction; his mouth is always dry, and he spits a good deal of tough mucus, which he finds particularly troublesome on awaking in the morning; his skin is husky and dry, with that peculiar hide-bound appearance, characteristic of well-marked cases of this disease. He does not know the exact quantity of urine he passes in twenty-four hours; but says it has increased greatly within the last three weeks. He has considerable irritation at the orifice of the urethra, and the prepuce does not cover the glans penis; has not suffered at any time from pain in the loins, but has been occasionally troubled with vertigo. Pulse 85, feeble, and irregular in strength.

April 12th. Has made rather more than sixteen pounds of urine within the last twenty-four hours; it is remarkably sweet, and has a faint sweet smell, and the ordinary colour of urine. A dose of castor-oil, which he took last night, has operated freely, and I have desired him to repeat the dose, from time to time, as he finds it necessary. He has been taking Dover's powder, and aromatic sulphuric acid prescribed by a practitioner in his neighbourhood, but has derived no permanent benefit from them; the latter remedy allayed his thirst very considerably for some time after he had commenced taking it, but as it ceased to produce that effect he discontinued its use. His diet has consisted chiefly of vegetable food since his appetite has so greatly increased. I desired him to confine himself entirely to animal food, and to take no medicine except castor-oil occasionally to open his bowels.

17th. He has eaten nothing but animal food since the 12th. This morning he was attacked with violent griping pains in the bowels, accompanied by constant nausea and frequent vomiting. These symptoms have been relieved by a full dose of the tincture of opium. The quantity of urine passed in twenty-four hours has been as follows;—on the 13th, 15 lbs. 4 oz.; 14th, 12 lbs.; 15th, 13 lbs. 6 oz.; 16th, 10 lbs. 4 oz.; 17th, 10 lbs. Its taste is still highly saccharine, and it ferments strongly on the addition of yeast. Pulse 92, regular in frequency, but very irregular in strength. To be allowed a small quantity of bread daily at his own earnest desire. Ordered a warm bath twice a-week, and friction over the body and limbs with a hair-brush night and morning; to take sixty drops of laudanum and a grain of tartar-emetic in divided doses in the course of the day; the quantity of the latter remedy to be gradually increased; to take exercise in the open air to as great an extent as his strength will allow.

27th. His thirst is now less urgent, and his appetite is more easily satisfied; he is not obliged to get up so frequently during the night to make urine, the quantity of which during the last twenty-four hours was only eight pounds. He took yesterday a grain and a half of tartar-emetic, but the quantity of laudanum has not been

increased ; he is in rather better spirits ; has not perspired, or observed any change in the state of his skin.

May 5th. Greatly against the wish of his friends he has been eating freely of potatoes at dinner, and has taken a good deal of sugar with tea. These errors in his regimen have greatly aggravated all the symptoms. He suffered severely yesterday from thirst, and passed twenty-one pounds of urine, which is more than he has made within twenty-four hours at any former period of the disease. He complains of his feet being always cold, and of vertigo with a sensation of throbbing at his temples. He is sullen and unwilling to speak. Ordered leeches to be applied to his temples.

6th. The bleeding has relieved his head. I have told him candidly to-day, that, unless he pay more attention to his diet, medicine can be of little use, and that the disease will in all probability destroy him. He has promised to be more careful in future. Ordered the laudanum to be gradually increased to the extent of two drachms, and also the tartar-emetic until it produced vomiting.

12th. His appetite and thirst are now more under control ; he feels much better and is more cheerful ; he has paid great attention to his diet since the 6th ; takes animal food more sparingly, and eats, twice a-day, a little bread made from the meal of beans :—the kidney bean contains a large proportion of gluten, and is on this account perhaps, as suitable an article of vegetable diet as he could use. The quantity of tartar-emetic having been augmented to two and a half grains, caused him to vomit twice yesterday very freely. He voided only about six pounds of urine in the last twenty-four hours. Pulse 80, stronger, and more regular.

15th. All the symptoms greatly ameliorated ; urine since yesterday only four pounds ; it is not nearly so sweet, but still ferments readily on the addition of yeast.

25th. Of late his diet has been carefully attended to, and he has taken the medicines prescribed very regularly, and has not neglected to employ the warm bath and friction with the hair-brush. The tincture of opium has not been increased beyond two drachms, and the quantity of tartar-emetic has been varied from half a grain to three grains in twenty-four hours, according to the state of his stomach. The quantity of urine in twenty-four hours has varied, since the 15th, from ten to four pounds, and it does not appear to contain so much saccharine matter. His skin is softer than it was, but he does not think he has perspired any for a long time. But although most of the essential symptoms of the disease are greatly relieved, he is still far from being well, and is liable, at any time, from the slightest error in regimen, to have all the symptoms aggravated.

30th. Being desirous of ascertaining whether the tartar-emetic and laudanum could be discontinued without any bad effect being produced, I directed my patient to leave them off, and to attend strictly to his diet. He soon found himself worse in every respect, and, at the expiration of three days, was glad to have recourse to them again. He informs me that he has relations residing in Ja-

maica. I have strongly advised him to go out there to try the effect of a warm climate. He is perfectly willing to do whatever is recommended, and, having consulted with his friends, is now making arrangements to sail for that island in the course of a few days.

Mr F. had a tedious passage to Jamaica, and suffered severely from sea sickness. He perspired freely while the nausea and vomiting continued, and his urine was reduced to nearly the natural quantity. In a letter which I had from him, dated three months after his arrival, he states that, by strict attention to diet, bathing, and friction, and by using the tartar-emetic and laudanum according to circumstances, he had gradually recovered. The *lichen tropicus* made its appearance on his skin about three weeks after his arrival, and continued several weeks. His urine does not exceed the natural quantity, and does not ferment on the addition of yeast. His skin is soft and perspirable; his weight has increased twelve pounds since he left home; he writes in good spirits, and says that he is enjoying better health than he had done for several years. Two years afterwards I learned from Mr F.'s friends at Edinburgh, that he had kept his health well at Jamaica, with the exception of a few weeks suffering from intermittent fever in the months of August and September 1837.

CASE III.—Monsieur F. R. a student in law at Paris, caught cold in November 1836, and had severe bronchitis which became chronic, and continued until the following January, leaving him much emaciated, and with a depression of spirits which he had never before experienced, his disposition being naturally gay and cheerful. His appetite has become truly voracious since he has got rid of the bronchitis. He has been in the habit of dining occasionally at the same table d'hôte with myself, and his friends have been rallying him on the extent of his appetite, and the little benefit he appears to derive from all the food he takes. He also drinks large quantities of *eau sucrée*, lemonade, and beer. He asked me if I could prescribe anything for him that would diminish his thirst. I suspected that he was labouring under diabetes, and requested him to taste his urine, which he found had a taste resembling that of honey and water. He is twenty-six years of age, is a native of the Mauritius, and has not been many years in Europe: he is dark complexioned, tall, and of a spare habit of body, weighs eight stones ten pounds; a year ago he weighed about ten stone; his skin is dry and rough, and gums are red and tender. He is sometimes two or three days without an evacuation from his bowels, but they are easily acted upon by any mild laxative medicine; he complains of a dull pain at the region of the kidneys; pulse 84, and feeble; no disorder of the penis; thinks the diabetic symptoms commenced about the beginning of January. I have explained to him the nature of his complaint, and have pointed out the necessity of confining his diet as much as possible to animal food, and of eating sparingly.

February 10, 1837. He has made fifteen pounds of urine since yesterday; it is of a pale straw colour, and ferments on the addition

of yeast. I have advised him to consult M. Biett, with whom he is acquainted. M. Biett recommends animal food, cupping over the loins, small doses of kermes mineral during the day, and acetate of morphia at night.

20th. He has been cupped twice, and the dull pain at his loins is much relieved. Has been eating more sparingly, and using very little vegetable food; his thirst is not so urgent, and he does not make so much urine. He is very weak, and has been little out of doors; says he cannot study, being unable to fix his attention to any subject, as when in health. The skin still continues dry and unper-spirable; he passed nine pounds of urine within the last twenty-four hours, which is still as sweet as before.

March 3. The pain at the region of the kidneys returned, and he was cupped again yesterday, and now feels easier in consequence. His urine has varied in quantity from ten to six pounds in twenty-four hours, and is still highly saccharine; its specific gravity has been found to vary from 1.036 to 1.042. Some of the symptoms are considerably abated, but there is no indication of a restoration to health.

I have advised M. R. to return to the Isle of France, and as M. Biett has a very unfavourable opinion of his case, he approves of my suggestion, and thinks it desirable that he should be among his relations. He sailed from Havre de Grace about the middle of March, and suffered little from sea sickness during the passage out, which was unusually long, but he was much troubled with constipation of the bowels. He was very little better on his arrival; but in the course of six months' residence he got gradually better, and all the diabetic symptoms disappeared. He informed me by letter that he took no medicine after his arrival, except laxatives occasionally; but that he paid great attention to his diet, and lived very abstemiously, bathed frequently, and rubbed his body and limbs well with a hair glove night and morning. This gentleman left the Isle of France some time afterwards in good health, and I never heard more of him.

London, October 2, 1837. CASE IV.—Mrs M. a widow, 31 years of age, has never had children; her form is slender, chest narrow, and she has altogether a very delicate appearance; her complexion is pale, her lips are colourless, and gums white, but not spongy or ulcerated. She has not been in good health for several years. Her father and two sisters died from *phthisis pulmonalis*, and she appears to be threatened with the same disease. Percussion elicits a dull sound under both clavicles; the respiratory sound is rough and blowing at the upper part of the left lung, and at the opposite side, the murmur can scarcely be heard at the upper third of the lung. Her appetite is very capricious, but she has no desire to eat much at a time; animal food without bread or vegetables produces nausea, and has on several occasions caused her to vomit. She is tormented with an unceasing desire to drink, but has in some degree learned to control this propensity. She has a great disinclination to motion or any kind of exertion, but is not peevish or fretful as is usually

the case with diabetic patients ; she is troubled at times with dyspnoea and vertigo ; going up stairs or walking a little quicker than usual is sure to bring on these symptoms ; her ankles swell towards bed-time, and her feet are always cold ; she complains of great weakness all in the back, and of a constant sensation of heat and itchiness at the orifice of the urethra, which is a source of great annoyance to her. Her bowels are generally inclined to be costive, but within the last three months she has had several slight attacks of diarrhoea. Her skin is dry and harsh, and presents the appearance of the *cutis anserina* or goose-skin. Her urine is of a pale straw colour, insipid, and without smell ; it varies in quantity from eight to fifteen pounds in twenty-four hours, and ferments on the addition of yeast. Pulse 85, feeble, and irregular in strength.

The diabetic symptoms commenced when she was residing at Clapham about seven months ago. She was cupped repeatedly from the loins, and has been using a variety of remedies without deriving any permanent advantage from them. The only medicine she now takes is lime water, which she thinks tends considerably to allay her thirst. I have prescribed tartar-emetic and laudanum to be taken in small doses during the day, and a grain of opium at bed-time, the quantity of these remedies to be gradually increased ; —the warm-bath to be used twice a-week, and friction with the hair-glove night and morning. She is already well aware of the necessity of attending to her diet.

15th. Mrs M. has been using the remedies prescribed very regularly, and thinks herself considerably better and is more cheerful ; her thirst is not so insatiable, and she is able to take exercise occasionally in the open air ; she has perspired freely several times during the night, and while walking ; but there is no change in the appearance of the skin. Within the last twenty-four hours she has only passed four pounds of urine, which has no saccharine taste, although it still ferments when mixed with a little yeast.

25th. She caught a slight cold three days ago, and is now much worse ; her thirst is unquenchable, and she has made twelve pounds of urine since yesterday ; it is slightly sweet to the taste, and of a greenish colour. Seeing little likelihood of her recovery in this country, I advised her to go to Madeira, and she embarked for that island shortly afterwards. I received from her about four months after her arrival a letter, informing me that she had got quite rid of her complaint, and perspired freely ; but she had not gained strength, and was as much emaciated as when she left England ; and that she had been troubled with a cough which was at times very distressing, but that she expected soon to be quite well and to be able to return home. I learned at the same time from her aunt, who had accompanied her to Madeira, that the disease from which she had suffered so much when at home had to all appearance left her, but that she was in a " deep decline," and not expected to live long. She died some months afterwards from *phthisis pulmonalis*.

London, 1838. CASE V.—Mr W. consulted me on the 4th of

September, when I found him in the following state.—He complains of excessive thirst ; his tongue is foul, with red edges ; his gums are unnaturally red and enlarged, and bleed when slightly rubbed. His appetite is considerably greater than it was before the commencement of his illness ; but though very capricious, is not nearly so keen as is usually experienced by diabetic patients. His bowels are costive, but he states that for several years they have been inclined to costiveness.

About one hour after eating he has pain at the stomach, which continues upwards of half an hour, sometimes considerably longer, but he is occasionally free from it for several days. He makes from twelve to fifteen pounds of urine daily, which is of a pale and slightly green colour, with a faint, not unpleasant odour, and a sweet taste, but not nearly so sweet as in the cases numbered 1 and 2. Of late, the desire to pass urine comes on so suddenly, that he is obliged to discharge it almost immediately ; and, in consequence of this, he does not go out so much as he used to do. He has phimosis, and the prepuce is considerably swollen and red.

His skin is slightly hot and dry, but not particularly rough, except on his arms and thighs, where it is very hard and scaly. His face is rather flushed ; pulse 86, feeble, and small. He has no pain in the region of the kidneys, but has a sensation of weakness at his loins, particularly after sitting long or walking. His complexion is fair, eyes are light blue ; before his illness he weighed upwards of twelve stone, at present he scarcely weighs eleven. He is 45 years of age, is married, and has three children ; but for a considerable length of time "*coitus nullus ; erectio nunquam : ne quidem semel rigescit.*" This appears to be always the case in confirmed diabetes. He has always been fond of good living, and has been accustomed to drink at least a pint of wine a-day regularly, and sometimes brandy and water in the evening as an accompaniment to a cigar ; but has never been addicted to intemperance in drinking ; his habits have always been regular and orderly. He has been in the habit of walking from Pimlico to the city in the morning, and walking back to dinner daily, unless when the weather was particularly unfavourable. He has suffered much from rheumatism, at times, during the last five or six years. He thinks his present complaint has been coming on gradually since his return from the West Indies about eight months ago. He is not aware of the nature of his complaint, and attributes it to a disordered condition of his liver and stomach ; the former organ is considerably enlarged, but not painful on pressure. He says he has taken no other remedies than Abernethy's pills at night, and black draught in the morning occasionally.

I ordered a saturnine lotion for his penis, and six leeches to be applied over his stomach ; a warm bath twice a-week, his skin to be well rubbed night and morning with a hair-glove. I have requested him to give up the use of wine and spirits, to live almost entirely on animal food, and to eat as sparingly as possible.

10th. The bleeding by leeches relieved the pain at the stomach, but it came on again yesterday with increased violence. The leeching

to be repeated. He has taken very little vegetable food ; says the animal diet heats him, and makes him feverish. Pulse 95, and hard ; little or no change in the quantity or condition of his urine.

15th. Complains again of tenderness at the epigastric region ; ordered the leeching to be repeated. The animal diet has made him vomit several times, and he insists on being allowed to eat a greater quantity of bread, of which he has been using very little lately ; has been taking beef-tea to breakfast. The leeches always relieve him much for a time ; he feels lighter after their application, and is not so thirsty. Last week he has diminished the quantity of his food and drink considerably ; his urine since yesterday was only eight pounds, which ferments on the addition of yeast.

18th. He still complains of tenderness at the epigastrium. I ordered the application of leeches to be repeated. He has been taking no medicine except castor-oil once a-week. Urine reduced to about six pounds in twenty-four hours, and is not nearly so sweet to the taste.

26th. He suffered so much from hunger during the night of the 24th, that he could not control his appetite, and got up and eat a large quantity of cold roast beef and pickles, with bread, and drank two glasses of bitter beer. He is much displeased with himself, and not without reason, for having yielded to the cravings of his appetite. The pain at stomach has returned, his thirst is now more urgent than it has ever been, and he has passed a great quantity of urine, which is much sweeter than it was when he first came under my charge. Ordered ten leeches to be applied over the region of the stomach.

October 4th. He has been paying great attention to his diet since the 26th, and has kept an account of every article he has eaten, which his wife assures me is correct ; the quantity is not half so great as he was in the habit of consuming when he first consulted me, and the thirst has diminished along with the decrease in the quantity of his food ; urine reduced to about six and a half pounds in twenty-four hours. He is in much better spirits, but feels weaker than he was sometime ago. He always feels so much better after applying leeches over the region of the stomach, that he has requested me to allow him to apply six more.

10th. He is now much better ; his thirst is not nearly so urgent, and appetite much diminished. Urine is only four pounds in twenty-four hours ; but it still ferments on the addition of yeast, and is very slightly sweet to the taste. He perspired freely last night, and a little the previous night. Ordered forty drops of laudanum to be taken every night at bed-time, and one grain of tartar-emetic dissolved in a pint of water, to be taken daily.

26th. He has attended strictly to his diet, and has taken the medicine regularly. He perspires during the night, and his skin is cool, and much softer ; his urine is now natural in quantity and has no saccharine taste ; it has a strong urinous smell, and does not ferment when mixed with yeast.

29th. My patient finding himself so much better, invited some friends to dinner, and eat and drank with them freely. He is, in

consequence of this indulgence, nearly as bad as ever he was. His thirst has returned, his skin is quite dry and hot, and his urine within the last twenty-four hours, amounted to ten pounds. He is greatly depressed in spirits. I explained to him that, in this country, the slightest error in diet or exposure to cold would be almost sure to aggravate his complaint, and that he must always consider himself as an invalid requiring the greatest care. I mentioned to him the good effects I had known to result, in similar cases, from residing in a warm climate, and he has determined to go out again to the West Indies. He sailed about a fortnight afterwards, and was then very much better, his urine being nearly in the natural quantity. He soon got well in the West Indies, and came home the following summer in very good health, and returned in autumn with his wife and children.

January 13, 1840. CASE VI.—William Bowman, footman to Mr A., has been complaining for several months of pain at the region of the stomach after eating, and of great depression of spirits; he has become considerably thinner of late; and his face presents that appearance which is usually seen in gin drinkers, although his master assures me that he is a man of temperate habits, and not addicted to any kind of excess. He caught cold about two months ago, and was affected with hoarseness and a severe cough for nearly three weeks; since then he has been unusually thirsty, and is now obliged to drink two or three times during the night. He has always had a good appetite, but lately it has so greatly increased that he says he feels quite ashamed to eat so much.

He has never ascertained the quantity of urine passed in twenty-four hours; it is much greater than natural; but this he attributes to the large quantity of water he drinks. His skin is dry and imperspirable, but not very rough, although he thinks it is becoming every day more so. He complains of palpitation and a fluttering sensation at his heart, with dyspnoea, when he walks quick or exerts himself more than ordinary; his tongue is white with red edges, and he has a disagreeable taste in his mouth, which is always clammy; there is nothing unusual in the appearance of his gums; no phimosis or irritation at the mouth of the urethra; pulse 78, soft and feeble. He is thirty-eight years of age; has a fair complexion, gray eyes, and light brown hair; he weighs ten stones seven pounds; about six months ago his weight was eleven stones four pounds.

Ordered a dose of castor-oil, to have six leeches applied over the epigastric region, the warm bath twice a-week, and friction of the skin with a hair glove night and morning, to wear flannel, which he has never been accustomed to do, to eat and drink as little as possible, and not to drink anything stronger than water, and to refrain from using vegetable food altogether, if he can.

14th. He has made within the last twenty-four hours twelve pounds of urine, as nearly as he can ascertain, which has the usual pale straw colour, and is sweet to the taste. His stomach still con-

times painful after eating, I have therefore ordered the application of leeches to be repeated.

18th. He had no pain at stomach for forty-eight hours after the second application of the leeches ; but it has returned, and leeches are to be again applied this evening.

24th. Felt much relieved after using the leeches, he thinks they produce the effect of diminishing his thirst, and as there is still some tenderness when pressure is made over the stomach, I have ordered six more to be applied.

February 2d. He thinks the leeches have been of great service to him ; his thirst is not nearly so urgent, and he has no pain or tenderness at stomach. He has used very little vegetable food since the commencement of the treatment, and has been sometimes two and even three days without tasting even the smallest portion of bread. Yesterday he vomited freely after eating mutton chops, and to-day the smell of meat makes him sick. To be allowed a little boiled rice with butter this evening at his urgent request. Urine six pounds since yesterday, and not so sweet to the taste, but ferments on the addition of a little yeast ; skin not quite so dry. Pulse 76, and not so feeble.

12th. He has taken a little boiled rice daily at dinner, and has greatly abridged his diet ; he again complains much of thirst, and thinks it might be relieved by leeches, of which he is to apply six more this evening. During two days he made only eight pounds of urine ; it is now increased to about seven pounds daily.

15th. He feels stronger and in better spirits ; the leeches relieved his thirst very considerably, and he has requested permission to apply six more. But he has become so much emaciated, and as he had no longer any pain or tenderness at his stomach, I feel unwilling to abstract more blood, and have ordered laudanum and tartar-emetic as in the last case. Urine has varied from seven pounds to four pounds a-day, and is still sweet.

24th. He has perspired a little during the night since he began taking the tartar-emetic and laudanum, and his skin, which had become very rough and scaly, is now softer ; urine much the same in quantity, but not nearly so sweet. His desire for food and drink is not so urgent, but the slightest indulgence or exposure to cold makes him worse. His master's brother intends sailing for Rio Janeiro in the course of a few days. I have intimated to him that a residence for some time in a warm climate might be the means of saving Bowman's life, and he has consented to take him with him. Bowman was very sea-sick on the passage out, and perspired freely ; he was much better on his arrival at Rio, and, according to his own account, got quite well after a few months' residence there. His master also gave me a very favourable account of him ; he had become much stouter, and as active as ever he had been ; he perspired freely, and his urine was natural in quantity, and did not ferment from the addition of yeast, but for some months after his

arrival it had continued to ferment slightly when tested with yeast. He came home some time afterwards in good health.

His friends at Manchester, however, have since informed me that he had been again attacked with diabetes, which terminated his existence at Birmingham in the winter of 1841.

The preceding cases might have been detailed with more minuteness and at greater length, and extracts might be given from the patients' letters describing the changes produced on the disease when subjected to the constant operation of a high temperature. But this would have extended the paper to a length that would have rendered it unsuitable for insertion in a medical journal.

I have not stated the quantity of ingesta in any of the cases, but in no case of diabetes that has come under my notice has the quantity of urine for more than a day or two at a time exceeded the quantity of the whole ingesta, and I am strongly inclined to think that it never does so for any length of time: if we take the average quantity of the ingesta and egesta, the latter will not often be found to preponderate materially. I am well aware that the observations of others have led them to hold a contrary opinion, but I cannot help thinking that they have been deceived by the patients whose cases they have recorded. The constant cravings of the patient for vegetable food and drink render him so importunate that his relatives or persons in attendance are induced to grant indulgences which they know will be injurious, and they are afterwards ashamed to confess their own and the patient's weakness to the medical attendant. I have had good reason to distrust the veracity of all the diabetic patients I have had under my charge. Three of them, after they believed themselves restored to health, admitted that they had at times eat and drank more than I had any idea of,—that, to use their own words, they had often cheated me, though at the time they strenuously denied having done so. The same kind of deception is continually practised in hospitals. I recollect the case of a woman with diabetes in the hospital at Florence who was in the habit of getting up during the night and stealing the ptisans of the other patients in the ward, and eating every scrap of vegetable substance she could find.

I have found tartar-emetic of great value in the treatment of diabetes; it is preferable to James's powder, which, even in the largest doses, is uncertain and produces very little effect; the former remedy given so as to excite occasional nausea diminishes the desire for food, and has also considerable influence in moderating the thirst, and thus, by diminishing the ingesta, is of very essential service. It also has a greater tendency, than any other remedy that I have tried, to promote perspiration, when its use is steadily persevered in for some length of time. A much

greater quantity of this remedy may be taken without producing sickness at stomach when combined with laudanum.

Success in a few cases does not authorise me to draw a strong conclusion. But I am nevertheless much impressed with the belief that residence in a warm climate, when practicable, conjoined with proper regimen, will hereafter be found to possess greater influence over diabetes than any other remedial means hitherto proposed. The powerful and continued operation of a warm climate, and its simplicity as a remedial agent, give it a decided superiority when contrasted with the many unscientific and uncertain remedies which have been hitherto used to overcome this obstinate and dangerous malady.

ART. IV.—*A Concise View of the Progress of Military Medical Literature in this country ; being a chronological arrangement of Authors, with Critical Remarks on their Works.* By JAMES IRVING, M. D.

THE advantages of the army, as a school for the study of practical medicine, have been so long and so well known to the profession at large, that it is altogether superfluous to insist upon them in this place. The British army indeed affords medical officers the most favourable opportunities for acquainting themselves with the means to be used for the prevention of disease, for its treatment in the earliest stages, for the exhibition of remedies, and the employment of new methods of cure, for viewing the diseases of tropical climates, and for observing the numerous cases requiring medical or surgical aid during the time of war. For the study and investigation of disease, such being the admitted advantages possessed by surgeons in our military service, we naturally inquire, to what extent, and in what degree, they have advanced our knowledge of the healing art. It is the object of this paper to furnish an answer to such a question ; and let me briefly mention the plan which I have attempted to follow.

A catalogue of works by medical officers of the British army and the Hon. East India Company's military service, has been carefully formed and arranged in chronological order ; no books having been admitted into this list which, though referring to the health or diseases of soldiers, are written by individuals who have not served in the army. A few remarks are added with the view of showing the scope of the publication, or the doctrines and improvements which it has been instrumental in promulgating. In this manner, perhaps, before any other, are we enabled to trace the history of medicomilitary literature, and to observe its gradual developement. Some of the earlier works in this catalogue I regret that I have been unable to see ; but have thought it right to give some short notice of

them, on the authority of Dr Aikin,* who has mentioned most of them in his "Biographical Memoirs of Medicine." As to the correct dates of some of the earlier publications I have often been much at a loss, seeing that different authorities have given them very differently; in most instances, however, the authority of Dr Watt, in his "Bibliotheca Britannica," has been preferred. The remarks on the works in the catalogue are intended to show what the author actually did,—not what he might have done. To criticise the productions of some of the most distinguished investigators of medical science would argue presumption, and, in fact, would not accomplish the object of this paper. But as to some readers it might be interesting to know where a critical account of the book may be found, it has been thought advisable to give a reference to some leading review or journal, where the performance is noticed. The biographical notices, which are of necessity short and meagre, have been given with the view of pointing out the military services of the author, and the opportunities that he enjoyed of acquiring the information which his work may contain. Bearing in mind what has been already stated, as to the advantages which the army presents for the study of medicine, when we glance at the following catalogue we must regret that the list of military medical writers is not much longer; but when we reflect on the merits of many productions included in this catalogue, we ought to feel abundantly thankful for what we actually possess.

It was not till comparatively a recent period that any of the civilized states of Europe thought it expedient to make a regular provision for rendering medical assistance to their fleets and armies. In our own country it seems formerly to have been the practice, when any military or naval expedition was undertaken, to select from civil life a few medical men to accompany the army or fleet, and, after a temporary service, they resumed their former occupations. While in the public service, they were often treated like so many camp-followers, as appears from documents published by Captain Grose in his "Military Antiquities"†; and they frequently received less pay than the drummers and fifers. At this period an army only kept the field for a few weeks, and, after a few desperate struggles, the vanquishers and the vanquished generally retired to their homes, when most of the troops were disbanded till another emergency might require their aid. Two causes contributed to render such a proceeding necessary; namely, the want of pecuniary resources to maintain a large army for any length of time, or in a foreign country; and the chance of sickness breaking out

* Aikin seems to be a much more creditable authority than Hutchinson, (*Biographia Medica*.) In many cases, indeed, the latter closely follows the former, and in not a few instances gives whole passages, word for word, without using inverted commas.

† The military code of Henry V. (1415,) in enumerating those who are subject to the constable and marshal, introduces the barber-surgeon and physician along with the following company,—“whether soldiers, shoe-makers, tailors, barbers, physicians, or washerwomen.”

among the troops, and so thinning the ranks as to render the expedition ineffective.

The application of gunpowder to purposes of modern warfare was the first circumstance which led medical men to the study of that division of the profession, now usually known as Military Surgery. This branch was first most particularly studied on the continent, and especially in Italy, which produced such eminent military surgeons as John de Vigo of Genoa, who is also distinguished as having been the first to use mercury in the venereal disease; Alphonso Ferri of Naples; Bartolomeo Maggi of Bologna; and many others, each of whom composed works on the treatment of gunshot wounds. Besides these we have works by Roger and Rolando of Parma, Bruno of Padua, William of Placentia, and his pupil Lanfranc, on the wounds caused by the warlike weapons of the thirteenth century. As may readily be conceived, from the rough treatment employed in the cure of gunshot and other wounds, the mortality was very great; caustics and escharotic substances being applied to the fresh wounds in order to bring about a proper digestion. But, as Italy was a constant theatre of warlike operations, opportunities, not open to those of other countries, were thus afforded for their surgeons to study gunshot wounds. We accordingly find that the surgeons of England and France were considerably behind those of Italy in this respect; and indeed it was not till the middle of the sixteenth century, that any book on the subject was published in England by a person of any actual experience. Immediately after this period, however, there were several treatises published by British surgeons who had served in the wars.

Yet all this time, while the treatment of the injuries incident to a military life was becoming more judicious, and governed by sounder principles, military medicine, and hygiene were in a most barbarous state, from which it was only after a long interval that it made any advancement; while, in many countries of Europe, the means of preserving the health of troops never formed a subject of inquiry. But the peculiarly exposed position of the empire of Germany, which rendered it the seat of almost incessant warfare, gradually forced the authorities to pay more attention to those important subjects; especially as the armies of that country have all along been subject to some very deadly forms of disease in the shape of agues, remittent fevers, and *typhus castrorum*. This subject was in succession discussed by Danish, Italian, and French writers before it attracted much notice in England. But, about the middle of the eighteenth century, some very valuable works were published by medical officers of the British army, which, from the valuable observations they contained, totally eclipsed the continental performances by which they had been preceded.*

* The substance of the above statement is chiefly derived from an article in the *Edinburgh Medical and Surgical Journal*, Vol. xi. p. 438. That article evinces an extensive acquaintance with this subject, and gives a most interesting view of the rise of Military Medicine and Surgery.

1563. An excellent Treatise on Wounds made with Gunshot ; in which is confuted both the grosse error of Jerome de Brunswicke, John Vigo, Alphonse Ferrius, and others, in that they make the wound venemous whiche cometh through the common powder and shotte. And also there is set out a method of curing those Woundes. By Thomas Gale. London, 8vo.

Thomas Gale, one of the first English writers on gunshot wounds, was born in the year 1507, and was educated under Richard Ferris, afterwards Sergeant-Surgeon to Queen Elizabeth. Gale served in the army of Henry VIII. against France, and was present at the siege of Montreuil in 1544. He also served in a medical capacity in the army which was sent against St Quintin in the year 1557, during the reign of Mary and Philip. Towards the latter end of the sixteenth century, perhaps about the year 1570, he settled in London as a practitioner, and rose to considerable eminence. The time of his death has not been ascertained, but he was still living in 1586. He was the author of several works to be afterwards mentioned, besides several translations from the Greek physicians.

His treatise on gunshot wounds is intended, as its title indicates, to confute an opinion very prevalent at the time, and one which had been ably supported by Jerome of Brunswick and some other writers, who endeavoured to prove that gunpowder gave rise to a venomous wound. In order to expose this notion, he quotes the opinion of Galen and Dioscorides, that the ingredients of which gunpowder is composed often proved extremely useful as remedies. He seems however to have fallen into the mistake of supposing that the *nitre* of the ancient physicians was the same as the nitre or nitrate of potass of the modern chemist ; whereas, the nitre of the ancients is usually believed to be identical with our carbonate of soda.

He also exposes another very prevalent error,—that of fancying that a ball or any other body projected by means of fire-arms acquires, in passing through the air, such a heat as to make a wound similar to that inflicted by a cautery. He therefore adopted a milder method of cure than was then usually followed, and treating gunshot as simple contused wounds, endeavoured to procure “their laudable digestion.” This then was a decided improvement on the usual practice of his day ; yet many of the remedies proposed by Gale, with the view of causing digestion of the wound, must have been quite unnecessary, and were more violent in their action than was at all advisable ; such, for example, as his ointments of precipitate and *Ægypticum*. (*Aikin’s Biog. Mem. of Med. Hutchinson’s Biog. Med.*)

1563. An Enchiridion of Chirurgerie ; conteyning the exacte and perfecte Cure of Woundes, Fractures, and Dislocations. By Thomas Gale. London, 8vo.

The Enchiridion is chiefly composed of accounts of the most common surgical diseases, taken from other writers on the subject, and

containing little that is new or interesting. He gives a formula of his own for making a powder to restrain hæmorrhage. Its principal ingredients are alum, lime, arsenic, and strong vinegar; and it is to be applied by means of tow covered with the white of eggs, to which the powder adheres, and is thus put to the stump or bleeding orifice. He affirms that this is an infallible remedy, and that he never lost a patient on whom it had been used. (Aikin. Hutchinson.)

1575. A short profitable Treatise, touching the Cure of the disease called *Morbus Gallicus* by Unctions, &c. By William Clowes. London, 8vo.

William Clowes, a contemporary of Gale, and of whose birth the date is unknown, studied surgery under George Keble, a London practitioner; and, entering the navy, was, in the year 1570, surgeon to the ship *Aid*. He does not however seem to have remained long afloat, but returned to London and was appointed surgeon to St Bartholomew's and Christ's Hospitals. In the year 1586, Clowes having received letters from the Earl of Leicester, and, by command of the Queen, repaired to the Low Countries in order to take care of the wounded in the English army, which had been sent over to assist the Dutch against the invasion of Philip of Spain. He was afterwards appointed surgeon to Elizabeth, and was retained in the service of James I. Returning from Holland he again entered into private practice, and was elected "Master of the Surgeons' Company." It is difficult to fix with accuracy the time of his death, for one authority speaks of him as dead in 1631, while another has an "Epistle of Salutation to William Clowes, Esq., Serjeant-Surgeon to His Majesty," prefixed to a book printed in 1638. It is however probable that he died before the year 1631, but the precise date cannot be ascertained. (Aikin. Hutchinson. *Biographie Médicale*.)

The treatise on the "*Disease called Morbus Gallicus*," consists of a full account of the venereal disease; which is rendered more interesting, by containing a record of the author's practice in such cases at St Bartholomew's Hospital, where we are told he for five years treated annually upwards of 200 cases of syphilis. He recommends for the cure the plan then universally in vogue, viz. salivation by means of mercurials, and the use of diaphoretics. Of the nature of quicksilver he has appended an account, which has been usually considered as a compilation from other writers. (Aikin. Hutchinson.)

Editions.—Lond. 1575, 8vo. Lond. 1585, 4to. Lond. 1595, 4to. Lond. 1637, 4to. (*Biographie Médicale*.) Dr Watt, who is a better authority, gives a different account, as follows:—Lond. 1575, 8vo. Lond. 1579, 8vo. Of this a greatly enlarged edition was published, Lond. 1585, 4to. Lond. 1588, 4to. This work was afterwards joined to his *Treatise on Gunshot Wounds*. (*Bibliothec. Britan.*)

1586. Certain Works of Galen called "*Methodus Medendi* ;" with a brief Declaration of the worthy Art of Medicine ; the Office of a Chirurgion ; and an Epitome of the third book of Galen, of Natural Faculties. All done into English, by Thomas Gale. London, 4to.

The original treatises in this collection, which is dedicated to Sir H. Neville, Master of the Horse to Queen Elizabeth, have, for their chief object, to give a history of the healing art,—to point out the connection between medicine and surgery in their various branches,—and to show the necessity of their study being founded on scientific principles. The book is interesting from containing much curious matter regarding the history of medical practice in the army at that date ; and certainly the picture which he has so graphically drawn is a fearful one, for it represents empirics and men of no education as having usurped the place of the regularly-bred surgeon :—"Some were sow-gelders, and some horse-gelders, with tinkers and cobblers."* The remaining part of this volume consists of translations of the 3d, 4th, 5th, and 6th books of Galen's "*Therapeuticon*" and his book on "*Præternatural Tumours*," with an epitome of his treatise on the "*Natural Faculties*." (Aikin. Hutchinsonson.)

1586. Certain Works in Chirurgerie newly compiled and published. 1. The Institution of Chirurgerie. 2. Enchiridion, the cure of Wounds, &c. 3. Of Wounds made with Gun-shot. 4. Antidotarie. By Thomas Gale. London, 4to.

It will be perceived that the more important of the treatises above mentioned were published in a separate form, and have been already noticed. The "*Institution of Chirurgerie*" is an introduction to the art of surgery in the form of a dialogue, in which Gale and John Field, fellow-pupils under Ferris, are represented as answering the questions of John Yates, a student. The "*Antidotarie*" consists of a collection of the most approved surgical remedies.

Editions.—Dr Watt says that this was first published in 1563, 4to, and reprinted in 1586, (Bib. Brit.)

1591. A proved Practice for all Young Chirurgions, concerning Burning with Gunpowder, and wounds made with gunshot, sword, halbert, pike, lance, or such other. By William Clowes. London, 8vo.

To several editions of his treatise on the venereal disease, Clowes annexed some observations on gunshot wounds ; but into the consideration of such accidents, he has entered with fulness and precision in this work, which is entirely devoted to the subject. In the treatment of gunshot wounds, he has the merit of having introduced a practice which has often been claimed as an improvement

* See Aikin's Biographical Memoirs of Medicine, or Hutchinson's Biographia Medica, Vol. vi. p. 227.

of more modern date, namely, the employment of mucilaginous cataplasms by way of dressing, instead of oil and filthy unguents, so often used before and since. He records several successful cases treated on this plan, which evince his skill and judgment as a practitioner; but with the view of "comforting and fortifying the patient," he made use of warm and more stimulating applications than would be sanctioned by the surgical principles of the present day. For arresting hæmorrhage he employed astringent buttons applied to the wounded arteries by means of lint and bandages; and although acquainted with the French method of pulling out the arteries and tying them, he never practised it, but preferred his own plan, which "never failed."

1596. A profitable and necessary Book of Observations for all those that are burned with Gunpowder, &c., and also for curing of wounds made with musket and caliver shot, &c. Last of all is subjoined a short Treatise on the Cure of Lues Venerea; now again newly corrected and augmented. By William Clowes. London, 4to.

Editions.—Lond. 1596, 4to. Lond. 1637, 4to.

1596. The whole Course of Chyrurgerie; wherein is briefly set down the causes, signes, prognostications, and cures of all sorts of Tumours, Wounds, Ulcers, Fractures, Dislocations, and all other Diseases, usually practised by Chirur-gions. By Peter Lowe. London, 4to.*

Peter Lowe, of whose personal history little is known, was born in Scotland, but soon went over to the continent, where he remained many years. To his services abroad he thus alludes in his address "to the friendlie reader" of the *Whole Course of Chyrurgerie*:—"But I impart to you my labours, hidded secrets and experiments by me practised and dayly put in use, to the great comfort, ease and delight of you and such as have had occasion to use my helpe in France, Flanders, and elsewhere, the space of twenty-two years: Thereafter being chirurgian-major to the Spanish regiments at Paris two years; next following the French King, my master, in the wars six yeeres, where I tooke commoditie to practise all points and operations of chyrurgerie." In the title of the same book he is described as "Doctor in the Faculty of Surgery of Paris, and Ordinary Surgeon to the King of France and Navarre." Returning to this country somewhere about the end of the 16th or commencement of the 17th century, he settled in Glasgow, and obtained permission from the King of Scotland to found an institution, from which the Glasgow Faculty of Physicians and Surgeons claims to be descended.† (Aikin. Hutchinson.)

* I have not overlooked the fact of Peter Lowe having served altogether in foreign armies; but as he was a native of Britain, enjoyed many opportunities of studying the treatment of wounds, as he published his work in this country, and was altogether a remarkable personage, I shall here beg leave to introduce a brief notice of his work, although I thus deviate from my general plan.

† Dr Watt says that Lowe died at Glasgow in the year 1612. (Biblioth. Britan.)

His work on surgery is in the form of a systematic treatise, destined for the use of beginners, and part of it is in the form of a dialogue between Lowe and his son John. It contains copious references to other authorities, and especially to the Greek physicians, but at the same time embodies the result of his own varied experience. The subjects are arranged with very little regard to order, — a very large proportion of all surgical diseases being discussed under the head of tumours. His pages are adorned by some tolerable wood-cuts, intended to show the proper form and construction of instruments, and the mode of using them. Some of his operations are however rude in the extreme; and one may be selected as an example of the practical surgery of the time. In amputating a finger or a toe we are directed to use a pair of pliers, by which the part is chopped off at once, and with the "smallest pain;" for this instrument "in one instant cuts both flesh and bones. Some for this purpose doe use a sharpe chizell and a mallet, laying the member on a block, and so cuts it off."* As he had been so long abroad, he has adopted plans of treatment for different diseases, which, though followed on the continent, were only partially known in Britain. Many of these he takes occasion to bring under the notice of the reader, as, for example, the practice of Ambrose Paré, who, in putting a ligature on an artery, recommended that some of the surrounding substance should be included.

Editions.—Lond. 1596, 4to. Lond. 1612, 4to. Lond. 1634, 4to. Lond. 1654, 4to. Dr Watt mentions an edition of the date 1597; this, however, must be a mistake, as the second edition, which I have seen, was published in the year 1612. This book was translated into French in 1612, and into Portuguese in 1614.

1612. *The Chirurgeon's Mate, or Military and Domestic Surgeon.* By John Woodall. London, fol.

John Woodall, a surgeon of great eminence, employed in various branches of the public service, was born in the year 1569. In 1589 he went to France, as surgeon to the army sent by Queen Elizabeth to the assistance of Henry IV. For some time afterwards he seems to have travelled through various parts of the continent, supporting himself by curing the plague; nor did he return to London till after the Queen's death. He became a member of the Surgeons' Company, and was about the year 1612 elected Surgeon-General to the East India Company, and surgeon to St Bartholomew's Hospital. It is said that he was sent to Poland on some state-business of importance during the reign of James I. From his works it also appears, that he had acted as surgeon of a ship, and that in that capacity he had made several voyages to the East Indies; but at what period of his life this occurred, cannot be fixed with certainty. In 1626 he was entrusted by Charles I. with the charge of superintending the medical department of the Royal Navy, which

* *Whole Course of Chyrurgerie*, p. 100. 2d edit. Lond. 1612, 4to.

was at that time considerably augmented. Among other improvements introduced into the navy at this time, the pay of surgeons was considerably increased, and a bonus was granted proportioned to the size of each ship, for the purpose of furnishing the medicine-chest. (Aikin. Hutchinson.)

The "Chirurgion's Mate" was drawn up on the occasion of Mr Woodall's appointment as Surgeon-General to the East India Company, and was intended for the use of junior medical officers of that service. It consists of an enumeration and slight history of the uses of the medicines, instruments, and utensils necessary to furnish a surgeon's chest. In the treatment of gunshot wounds he adopted the error of the times, and recommended stimulating and hot dressings, with the view of averting the tendency to gangrene. In cases of hæmorrhage he tied the large vessels, and if that failed, applied buttons of an astringent powder to the bleeding arteries. But the most original and the most practical part of this work is the treatise on scurvy, which has been quoted by most authors of note who have since written on the disease. In his account of the pathology of the malady, however, his opinions are not by any means sound; for he affirms, among other things, that scurvy is essentially a disease of the spleen. In its treatment he was among the first, if not the very first medical writer to recommend the employment of the juice of limes, lemons, and tamarinds, as the best antiscorbutics; but at the same time he directs us not to neglect other remedies, and recommends especial attention to the diet and regimen of the patient.* (Aikin. Hutchinson.)

1628. Viaticum; or an Appendix to the Chirurgion's Mate.

By John Woodall. London, fol.

This work was published after Woodall's appointment as medical superintendent of the British navy, and is destined for the use of young practitioners on their entering as sea-surgeons. He appears to have invented a trephine, of which he has here given a description, and has fully pointed out the merits of the instrument.

1639. The whole Works of John Woodall; containing the Chirurgion's Mate and Viaticum, together with a Treatise on the Plague, and another on Gangrene and Sphacelus. London, fol.

Of the last two treatises, which were here published for the first time, that on the plague does not satisfy our estimate of what might have been expected from one who had so much experience of the disease, both on the continent and in London. It chiefly consists of an enumeration of antidotes for the plague, copied from other authors; and one of his own, called *Aurum Vitæ*, the preparation of which he does not divulge. His remarks on gangrene and sphacelus are worthy of particular notice, because intended to inculcate an

* An earlier and most remarkable instance, given by a non-professional writer, of the efficacy of lime-juice as an antiscorbutic, is to be found in "Purchas his Pilgrims," Vol. i. p. 149. Lond. 1625, fol.

important innovation in practice, namely, that of amputating a limb in the mortified instead of the sound part. He states that, although the idea struck him accidentally, he had continued the practice, and had in more than a hundred cases amputated under such circumstances, yet in not one did the patient die, or the mortification spread farther. In some general remarks on amputation, we have one of the first hints as to the expediency and safety of amputation at the ankle in cases of diseased foot,—a proceeding to which his attention was first drawn by observing the effects of some Eastern punishments, in which the feet are cut off; and although he confesses that he should not be the first to make the experiment in surgery, yet he wishes to draw attention to this method. (Aikin. Hutchinson.)

1672. *A Treatise on Wounds*. By Richard Wiseman. London, 8vo.

1676. *Several Chirurgical Treatises*. By Richard Wiseman. London, fol.

Richard Wiseman, a military surgeon of great experience, and one whose writings are often advantageously consulted at the present day, learned his art amid the horrors and carnage of the civil wars. Any biographical notice of Wiseman which I have seen is extremely meagre; but, from his own writings, I have been enabled to collect the following particulars of his life and services. He appears to have been born during the reign of James I., and having at an early age entered the army, he was present in several engagements. He afterwards accompanied Charles II., when a fugitive in Holland, France, and Flanders; and returning with him to Scotland, and still following the fortunes of his Royal master, marched with his army into England, and was taken prisoner at Worcester, whence he was carried to Chester. After being liberated, he returned to London in 1652, and assisted in practice Edward Mollins, a surgeon of some note. Wiseman appears also to have served in the British navy, besides being for three years in the Spanish naval service, as is evident from the following passage:—"Of which I have seen the frequent experiment during the three years I served in the King of Spain's navy."* It does not appear at what period he was engaged in the latter service, but it most probably was when he followed the King's fortunes on the continent. On account of his long and faithful services to the Royal Family, Charles created him one of his sergeant-surgeons. From the preface to his *Chirurgical Treatises*, which is dated May 1676, Wiseman appears then to have been in bad health; but the time of his death is uncertain.—(Aikin. Hutchinson. *Biograph. Médic.*)

The "*Chirurgical Treatises*," with the exception perhaps of the fifth, which is on wounds, and which was perhaps published separately in 1672, were written when bad health prevented him from following the more active duties of practice; and although, as stated in the preface, he had read all the standard surgical authors of

* Wiseman's *Chirurgical Treatises*, Book vii. § 3.

his day, yet, in composing this work, he chiefly relied on his own judgment and extended experience. The subjects of the Treatises are, tumours, ulcers, diseases of the anus, king's-evil, wounds, gunshot wounds, fractures, luxations, and syphilis. On the subject of gunshot wounds he has brought together a mass of very interesting matter, and has detailed numerous cases, which occurred in his own practice at Worcester, at the siege of Weymouth, at Dunkirk, at sea, and in many other situations. But we cannot be but startled that such a sagacious author, as all admit Wiseman to have been, should give the highest commendation to such a preparation as the following :—Boil, in 1 lb. of oil of lilies, two new-whelped puppies till the flesh fall off the bones ; add some earth-worms in wine. Then strain ; and to the strained liquor add ʒij of turpentine, and ʒj of spirit of wine. Another of his applications to gunshot wounds consisted of turpentine, olive oil, gum elemi, and verdigris. Wiseman was among the first, if not the very first, to point out the advantage of immediate amputation in some cases. Many of his remarks on this subject are excellent, and evidently result from the study of numerous cases which had fallen under his treatment. From many passages we may select the following, which indeed contains a summary of the practice now followed in regard to cases requiring an immediate amputation :—“Therefore you are to consider well the member, and if you have no probable hope of sanation, cut it off quickly, while the soldier is heated and in mettle. But if there be hopes of cure, proceed rationally to a right and methodical healing of such wounds ; it being more for your credit to save one member than to cut off many.”*

For stopping hæmorrhage, he speaks in the highest terms of a liquor which he had long and successfully used, and of which he published an account, with the detail of some experiments upon it, in the *Philosophical Transactions* for the year 1673. The treatise on the *Lues Venerea* contains nothing worthy of notice. It inculcates the treatment by violent salivation, the author holding that no case of syphilis was ever cured without the free use of mercury.

Editions.—Lond. 1676, fol. Lond. 1686, fol. Lond. 1719, 2 vols. 8vo.

1744, *The Method of Treating Gunshot Wounds.* By John Ranby. London, 12mo.

Of John Ranby little is now known ; and as far as I am aware, no detailed account of him has ever been published. From several notices it would however appear that he was a surgeon of great eminence, and one who in his time had held high appointments in the public service. In the year 1738 he was made surgeon to the household of George II. ;† and in 1740, one of his sergeant-surgeons.‡ In the capacity of principal sergeant-surgeon he accom-

* See also his *Chirurgical Treatises*, pp. 420 and 430.

† *Gentleman's Magazine*, Vol. viii. p. 381. ‡ *Ibid.* Vol. x. p. 525.

panied the king when he went to the continent to head an army which he had sent to the assistance of the Queen of Hungary against the French. He was present at the battle of Dettingen, and there had as a patient the Duke of Cumberland, the king's second son*. Ranby was in 1752 appointed surgeon to Chelsea Hospital in succession to the famous Cheselden, and he held this situation till the time of his death, which occurred on the 28th of August 1773.

This little book consists of observations which were made while the author served with the army on the continent. The views which it contains on the pathology of inflammation and gunshot wounds, are tolerably sound when compared with those of the present day, and consequently the general plan of treatment proposed, resembles the modern more than that of any author whom we have yet had occasion to mention.

In the treatment of gunshot wounds, he first of all employed copious general blood-letting, till all fear of inflammation had ceased, and at the same time encouraged local bleeding, in the belief that "bleeding from the smaller arteries in all contused wounds are of real service in unloading the clogged parts, cutting off the main sources of customary inflammation, and by that means either totally preventing a fever, or at least rendering it a symptom of no threatening tendency." He condemns all spirituous and stimulating applications, which had been so generally recommended by former writers; and by way of dressing he employed lint moistened with oil, and light bandaging. He advocates in most decided terms immediate amputations; and advises that, when there are no hopes of saving a limb, it should be immediately removed on the field of battle. He adds, "The neglecting of this juncture of taking off a limb, frequently reduces the patient to so low a state," and so acts on the constitution, "as must unavoidably render the result of the subsequent operation, if not entirely unsuccessful, at least exceedingly dubious."—P. 30.

But the author's principal object in this publication remains yet to be mentioned; it was to recommend the "signal use of the bark," which he elsewhere styles "a medicine that no human eloquence can deck with panegyric proportionable to its virtues." Accordingly, after having long made trial of it, he wished to introduce bark to the notice of surgeons, as a remedy in cases of wounds—as a substitute for opium—as a specific in venereal complaints—to prevent hæmorrhage—and to check colliquative sweating. No one will attempt to deny the power which cinchona possesses over several diseases to which the human frame is liable; but few would now-a-days be inclined to employ this remedy in most of the instances in which Ranby so highly eulogised its use. Let us take for example the case of gunshot wounds: bark may undoubtedly have proved of much service during convalescence; but none would now dream

* This case is fully detailed in the "Method of Treating Gunshot Wounds," p. 45, 2d edit. 1760.

of giving it while inflammatory symptoms were going on.* In other instances, as in that of the Duke of Cumberland, he seems to have employed the drug with the hope of arresting the febrile action consequent upon a gunshot wound. But in forming an opinion as to the propriety of this attempt, due attention ought to be paid to the words of Dr Heberden, who of such a practice remarks, "I am not so sure of its being useful as of its being innocent."†

In the appendix to this instructive little treatise are given some few regulations, which he drew up at the command of the Duke of Cumberland, for the use of regimental surgeons, on some points connected with the management of military hospitals, and the treatment of the sick soldier; and on these subjects he has left some valuable hints, equally useful to the service as it at present exists.

Editions.—Lond. 1744, 12mo. Lond. 1760, 12mo. Lond. 1761, 12mo.

1747. *Medicinæ Universæ Medulla, or a New Compendious Dispensary*, wherein is contained in a direct summary way all that is essentially necessary either with respect to Physick or Surgery, to answer every medicinal intention of cure. Compiled by command of His Royal Highness the Duke for the use of the Military Hospital abroad. By the King's Physician and Surgeon, the Surgeon-General and Apothecary-General of the Army. To which is added an English Translation, with a comment subjoined to each formula, showing to what specific cases each prescription is peculiarly efficacious, with proper indexes referring to the various maladies incident to the human body and their respective cures; and a Preface displaying the design and use of the whole. Calculated equally for the benefit of others as those of the Faculty. London, 8vo.

Editions.—Lond. 1747, 8vo. In 1748 there was a second edition,—“Revised, corrected, and, in regard to the contents, considerably augmented, together with an additional Appendix, and some Practical Suggestions on the use of Bleeding, now first published.”

1751. *Observations on the Epidemical Diseases in Minorca from the year 1744 to 1749.* To which is prefixed a short account of the climate, productions, inhabitants, and endemical distempers of that island. By George Cleghorn, M. D. London, 8vo.

Dr George Cleghorn was born at Granton, in the parish of Craigmond, near Edinburgh, on the 18th of December 1716. In the

* See Dr Gregory's *Elements of the Theory and Practice of Medicine*, p. 69, 5th edit.

† Heberden's *Commentaries on the History and Cure of Diseases*, p. 179. Lond. 1803, 8vo. Dr Heberden, however, besides entertaining a very high opinion of bark as an *antiperiodic*, thought it also a valuable remedy in “mortifications and other cases where a good suppuration was wanted.”

year 1731, with the view of studying medicine, he was placed under the care of Dr Alexander Monro, the founder of the medical school of Edinburgh.* Here he soon exhibited proofs of superior talents, and became the inseparable companion of the famous Fothergill, who was his fellow-student. In the autumn of 1734, Cleghorn, in conjunction with other five students, some of whom afterwards rose to eminence, formed an association, which gradually extended, and eventually obtained a charter as the Royal Medical Society. His associates were Dr Patrick Russel, the distinguished writer on plague, who settled at Aleppo; Dr Cumming of Dorchester; Dr Alexander Hamilton, son of the professor of divinity, and who went to practice medicine at Annapolis, North Carolina; Dr Andrew Taylor, who died in the East Indies; and Dr James Kennedy, who afterwards left the medical profession, and, entering the army, became senior captain in a regiment of dragoons.†

Such progress did Cleghorn make in his studies, that, when just entering his twentieth year, he was, in 1736, at the recommendation of Dr St Clair, appointed surgeon to the 22d regiment, then stationed at Minorca. In this island he remained thirteen years, and in 1749 returned with his regiment to Ireland, and shortly afterwards came to London with the view of publishing his "*Observations on the Diseases of Minorca*," under the superintendence of his friend Dr Fothergill. In the year 1751 he settled in Dublin, and was first appointed lecturer, and then professor of anatomy in that University. To this subject his attention had been early and minutely directed, and he may be reckoned the first person who established "what with any degree of propriety could be called an anatomical school in Ireland."‡ He was, in the year 1784, elected an honorary fellow of the King's and Queen's College of Physicians of Ireland, and of several other scientific and learned bodies. He died at his country-house in the county of Meath on the 22d of December 1789, at the age of 75. In 1790 his nephew, Dr James Cleghorn, was appointed his successor in the chair of anatomy. (Pettigrew's *Life of Lettsom*, Vol. i. p. 93. Hutchinson. *Biographie Médicale*.)

As to the merits of Dr Cleghorn and his treatise, no higher testimony could be given than are contained in the following words of Dr Fothergill, to whom during the course of correspondence he had communicated the leading doctrines of his work:—"Thou wilt admire the industry of our friend Cleghorn, who situated in a corner of the world, has made greater progress than any of us, who

* Irving's *Lives of Scottish Writers*, Vol. ii. p. 193. Edin. 1839, 2 vols. 12mo. Bower's *Hist. of the University of Edinburgh*, Vol. ii. chaps. x. xi. and xii.

† Pettigrew's *Life of Lettsom*, Vol. i. p. 94. Vol. iii. p. 288. Lond. 1817, 3 vols. 8vo. Lettsom's *Essay on the Character of Russel*, in *Fothergill's Works*, Vol. ii. p. 368. Lond. 1783, 2 vols. 8vo. Lettsom's *Life of Fothergill*, p. 124. Lond. 1783, 8vo.

‡ Wood's *Antient and Modern State of the Parish of Cramond*, p. 122. Edin. 1794, 4to.

even do not want the proper aids of study. Let us therefore stimulate one another that we may follow his footsteps, and become the worthy friends of so great a man."* Although his observations refer more particularly to the epidemics of a very small island, not now held by the British, they can by analogy be extended to many parts of the world whose seasons or their variations resemble those of Minorca. The introductory part of this volume furnishes us with much interesting matter regarding the natural history and productions of the island, and the manners and customs of the inhabitants. With the view of illustrating more fully the rise and progress of epidemics, he regularly kept a journal of the weather from the year 1744 to the year 1749. The diseases described are, tertian fevers, cholera, essera, rash, dysentery, pleurisy, and small-pox. He has given one of the best and most minute descriptions which we possess of the kinds and varieties of intermittent fevers, and has endeavoured to point out the symptoms distinctive of each, and the principles by which, from present circumstances, we may judge of the probable result of any case. His plan of treatment was vigorous and decided. When the patient was seen early, he drew blood, by which means he thought that "the vehemency of the paroxysm was somewhat diminished," and this, followed by a gentle purgative, was all that was required in some cases; but if on the fifth day the paroxysms were long and severe, he had immediate recourse to bark. Dr Cleghorn's plan of treating dysentery has been often quoted by contemporary and subsequent writers. If there was no fever present, he simply employed ipecacuanha or an antimonial, (*Nitrum Antimonii Ceratum*), which generally produced evacuations by vomiting and stool, sometimes also sweating during the following night, at which time he gave a gentle opiate. But in cases attended with twisting and constant pain, he usually premised blood-letting, and followed out the other branches of the antiphlogistic regimen, and "shunning opium as much as the intolerable torture of the distemper would permit." As soon as the pain and fever abated, he endeavoured to procure sufficient alvine evacuations, and in some cases immense masses of hardened feces were discharged. In some instances when other means had failed, the warm bath and six grains of calomel and one of opium given at night, followed next morning by a purgative of senna, manna, and sal-catharticum, proved of great service. In chronic cases he put the patient on mild farinaceous diet, and occasionally gave gentle laxatives, so as to prevent intestinal accumulations, and at the same time he administered an opiate twice a-day. By this plan of cure he thought he had saved many lives. Pleurisy and peripneumony, as observed by Cleghorn in Minorca, generally became epidemic during the winter months, and in some years carried off great numbers of the British troops. In its treatment he placed the chief reliance on blood-letting frequently repeated.

This performance evinces its author to have been a learned and

* Letter to Dr Cumming of Dorchester,—Lettsom's Life of Fothergill, p. 98.

accomplished man. It exhibits him as thoroughly versed in the practical details of the medical art, and at the same time not ignorant of what had been done or proposed by others. We are led to admire in him a virtue by no means common among members of the profession to which he belonged, namely, the candour and manliness with which he owns his mistakes, either in theory or practice, "thus showing that though subject to the lot of humanity in committing such errors, he raised himself above its rank, by his courage and ingenuousness in confessing them."

Editions.—*Lond.* 1751, 8vo. *Lond.* 1763, 8vo. *Lond.* 1768, 8vo. *Lond.* 1799, 8vo. A fifth edition was published in *Lond.* 1815, 8vo. The work has been translated into German by J. C. G. Ackermann. *Gotha*, 1776, 8vo.

Reviewed.—*Monthly Review*, vol. v. p. 214.

(*To be continued.*)

ART. V.—*Some Observations on the Tubercular or Gypseous disease of the Lower Animals.* By DAVID CRAIGIE, M.D., Fellow of the Royal College of Physicians, Senior Physician to the Royal Infirmary. (Read at the Evening Meeting of the College, 2d August 1843.)

ON the morning of Tuesday the 4th of July 1843, I sent a person to the public market in order to obtain the lungs of an ox, with the view of making some observations on the bronchial mucous membrane and its follicles. The lungs were indeed brought me; but in a state so changed by disease, that I found my anatomical inquiry converted into a pathological one.

While one of the lungs was tolerably sound, the other was occupied by many hard round masses of a gray or cream colour, which gave the idea of the encephalomatous tumour. Many of these were situate immediately beneath the pleura; others were manifestly in the substance of the lungs; and others seemed to be placed around the bronchial tubes. They varied in size from a garden pea to masses as large as a small pippin. In general the smallest bodies were situate towards the margin of the lungs; and the largest close round the bronchial tubes; but to this there were several exceptions. Upon dividing by the knife some of the largest masses, as well as several of the smallest bodies, I at once recognized them as the tubercular, or rather tyromatous and gypseous masses described by M. Dupuy; and, as such, I think some short notice of their anatomical and pathological relations may be not entirely void of interest.

Some of the large masses, not immediately enclosing the bronchial tubes, formed hard prominent tumours, irregular on the sur-

face. When divided they consisted of a firm hard capsule, cartilaginous in consistence or almost bony, and enclosing a quantity of gray or fawn-coloured soft matter, of the consistence of chalk or meal moistened with water. This interior matter was not arranged in any definite or regular order. Sometimes it seemed to consist of a number of globular or roundish masses various in size, aggregated together. These presented, however, no fibrous structure, or lamellated or stratified arrangement.

The masses or tumours outside the bronchial tubes were mostly small or middle-sized. They were, in like manner as the others, hard, firm, and irregular on the surface. When divided, they consisted of an external firm capsule, enclosing the same grayish or fawn-coloured putty-like matter, equally without definite structure, as in the other tumours. Though situate on the outside of the bronchial tubes, they had in many instances advanced through the substance or walls of the tubes to their inner surface, and formed there soft, spongy, fawn-coloured tumours, projecting above the mucous membrane, and with an irregular surface or apex, the outline of which also was irregular. At the points where these tumours had thus found their way into the inner part or cavity of the bronchial tubes, the mucous membrane had been destroyed, or at least it was in its integrity no longer perceptible. This destruction of parts by the progressive advancement of the disease was chiefly observed in the largest and middle-sized tubes. In the smallest it was either not so far advanced, that is, it had not proceeded through the walls of the tubes, and was still confined to their external surface, or it had done so in one or two points only. In the large tubes, on the other hand, this species of ulcerative destruction, for such it appeared truly to be, had taken place in six, eight, or ten points of the tube or tubes, successively or simultaneously.

The tubes thus attacked were rendered rough and irregular on their inner or mucous surface by fawn-coloured fungous-looking masses, varying in size, number, and shape. Another change also they had undergone in secretion. All the tubes in any degree affected by the tumours were filled with viscid glairy mucus, in some parts streaked with blood, and which lay in long ropy cylinders along their interior, projecting also from the small tubes into the large ones. The membrane, nevertheless, could not be said to be reddened or thickened. It was rather pale coloured; perhaps a little softened.

The matter contained in the bronchial glands in this case, which corresponds in all respects to what I have elsewhere termed tyromatous (*Τυρομα*, *Caseus*), was quite homogeneous and void of distinct organization. Even when placed under the microscope, it could not be said to present distinct traces of organization.

When treated with nitric acid diluted with an equal weight of water, this substance became more yellow and firmer; but at the same time rendered the liquor turbid, and gave it a greenish-yellow colour.

From the circumstances under which this specimen of morbid structure was obtained, it was impracticable to procure any information regarding the state or symptoms of the animal during life. That the animal, however, laboured under a severe affection of the lungs, with breathlessness, cough, and the discharge of much inflammatory mucus from the windpipe, is manifest, and must be inferred from the appearances presented after death. It may be further inferred from the destruction of the bronchial membrane in several of the tubes, that the animal would present a set of symptoms very similar to those of pulmonary consumption. Considerable wasting must have taken place; the animal must have been emaciated and extremely feeble; and there can be little doubt had for some time laboured under symptoms of habitual or hectic fever. The natural tendency of such a malady is to death; and it is a conclusion not only natural but necessary, that this animal must have speedily died of the lesions of the bronchial tubes already described.

In the example of bronchial disease now recorded, the bronchial tubes and membrane appear not to have been first affected. The first and earliest marks of disease appeared in the bronchial glands outside the tubes, and the bronchial textures and membrane were affected only secondarily, and after a considerable time. This is the reverse of the usual course, or at least of what is supposed to be the usual course of morbid action in these parts. It is usually believed that the bronchial membrane or its follicles are first affected; and then that the ulceration spreads from within outwards; and further, that the bronchial glands become enlarged, irritated, and diseased only in consequence of the previous affection of the bronchial membrane. So far as a judgment could be framed in this case, the bronchial glands had caused the inflammation and ulceration of the bronchial tubes and the mucous membrane; and had not the former bodies been so much enlarged as to press on the latter, the latter would not have become ulcerated.

No doubt can be entertained that the case, the outlines of which have been here detailed, is an example of the disease which has been described under the name of tubercular and gypseous or plaster-like in the ox. This Dupuy places along with, and considers as analogous to, if not identical with* the glanders

* De l'Affection Tuberculeuse vulgairement appelée Morve, Pulmonie, Gourme, Farcin, Fausse Gourme, Pommelère, Phthisie du Singe, du Chat, du Chien, et

in the horse; but for this arrangement I cannot see any good reason. It doubtless tends to destroy the lungs of the animal, as certainly as the glanders does that of the horse. But it does not accomplish this destruction in the same manner, neither does it attack the same textures.

In the ox this disease attacks first the bronchial glands, and then proceeds to destroy the bronchial tubes, in which it produces ulceration with a glairy mucous discharge from the mucous surface of the bronchial tubes. In the course of this process, however, the tyromatous masses, by their size and situation, must have compressed much not only the large bronchial tubes, which they closely embraced, but also the middle-sized tubes, the substance of the lungs, and even the blood-vessels. In short these tyromatous masses, partly by compressing the bronchial tubes and contiguous portions of the lung, partly by causing ulceration in the former, brought about a state of health incompatible with the continuance of life.

In glanders in the horse, it is well known that the disease betrays its action in general first on the Schneiderian membrane; that it produces tubercles and bad ulcers in the whole of this membrane, and eventually affects the subjacent bones, so that the bones of the nasal passages are generally in a state of *caries* before the death of the animal. From the nasal cavities and membrane it proceeds to the lungs, where it causes either pneumonia or tubercular destruction of these bodies. The disease here described does not show itself in this manner in the ox.

In another respect there appears a difference not less striking. In glanders both in the horse and in the human subject, the animal poison produces in the lungs a sort of gangrenous pneumonia, in other words, gangrene of the lungs. This, indeed, actually took place in a patient of my own in the Royal Infirmary in the course of this last winter, in whom symptoms of chronic farcy appeared,* and it seems a common result in the horse, according to Dupuy, and also Rayer. In this disease, however, gangrene is very rarely, or rather never observed to take place; and the structure of the lungs is destroyed and their functions impaired, as I have already said, by ulcerative openings in the bronchial tubes, by the fungating growths projecting into their interior, and by the profuse discharge of viscid mucus, the product of inflammation.

If there be any foundation for the opinion of M. Dupuy, it is fruitful to think that the flesh of animals destroyed by this dia-

des Oiseaux Domestiques; Comparée à l'Affecton l'Hydatideuse ou pourriture du mouton, du lapin, du lievre, et à la ladrerie du Cochon. Par M. Dupuy, Médecin-Vétérinaire, et Professeur à l'Ecole Royale et Economie Rurale et Vétérinaire, d'Alfort, &c. Paris, 1817, p. 253; Quatrième Division.

* Edinburgh Medical and Surgical Journal, Vol. liv. p. 127.

case is exposed in the public markets for food. Though I could obtain no information about the history of the ox in which the bronchial glands were diseased, there cannot be a doubt that its flesh was sold in the usual manner, and found its way into the interior of a certain number of the lieges.

I have said that this is an instance of the disease described by Dupuy as occurring in cattle, and known under the various denominations of *pommeliere*, or apple disease, chronic consumption, diarrhoea of calves, mesenteric atrophy, worm disease, &c.* In some respects, however, it either differs from the distemper described by Dupuy, or the latter author has not very accurately described the changes which take place. He mentions, indeed, in his several inspections, in the tissue of the lungs deposits of yellow-coloured plaster-like matter, and spherical tumours of tubercular matter like pippins, like eggs, or like peas, and occasionally bodies like hydatids. And he notices that the same bodies and the same matter are deposited in the bronchial glands. He speaks also of vomices and tubercles in the lungs. But he nowhere notices the fact that these glandular tyromatous matters had destroyed by ulceration the walls of the bronchi, or penetrated into their interior by fungous growths, or that they were the main cause of the profuse morbid secretion furnished by the bronchial membrane.

From the appearances presented by the lung here shown, it results that the tyromatous deposit is confined almost exclusively to the bronchial glands, and does not primarily affect the tissue of the lungs. In this respect the intelligent pathologist will recognise a difference between the distemper in the ox and pulmonary consumption in the human subject.

Portal entertained the idea that tubercles of the lungs were seated in the bronchial glands. On what circumstances that learned anatomist founded this opinion I have never been able to discover. I cannot suppose that it could have been on the evidence of morbid anatomy; for inspection of the bodies of those destroyed by tubercular disease of the lungs affords no countenance to such an inference. The bronchial glands are situate on the outer aspect of the bronchial tubes, and chiefly round the large and middle-sized tubes; while the masses of aggregated tubercles are situate within the substance of the lungs; and, so far as can be judged from the observations of Schroeder, Carswell, and Cerutti, are formed at the terminal ends of the bronchial tubes.

This disease in the bronchial glands of the ox may be regarded as settling the question completely. It shows what tubercular disease in the bronchial glands would be; and it shows that

* De l'Affection Tuberculeuse, &c. p. 253, &c.

though the symptoms produced are in many respects similar, or even the same, the anatomical characters and the lesions are very different. In this disease the substance of the lungs may be entire, while the bronchial glands and tubes are irreparably injured.

Let me not, however, be misunderstood. I do not mean to deny the existence of tubercular deposit in the lungs of the ox, or of the tyromatous disease in the bronchial glands of the human subject. In man the bronchial glands are occasionally found infiltrated by this tubercular or tyromatous deposit; but it is chiefly in children that this disease is observed; and indeed it has afforded to an ingenious physician, whose loss the profession must lament, the foundation of a theory of the occurrence of *laryngismus stridulus*. In the adult, however, it is not very frequent. In the ox, on the other hand, it seems to be not uncommon.

It may be further observed that the two diseases, that is, tubercular disorganization of the lungs, and tyromatous enlargement of the bronchial glands, may exist together in children, and not unusually do exist together. This conjunction I have seen pretty often, and observed it very distinctly in a child of about 20 or 22 months, the daughter of a woman under my care in the Infirmary. The child died with the usual symptoms of wasting disease of the lungs. Upon inspecting the body I found the lungs extensively tuberculated, with one or two ragged vomices in the lower part of the upper lobe, and in the middle lobe of the right lung; and the bronchial glands outside the bronchial tubes much enlarged, and presenting cheesy or curd-like matter. None of these glands, however, had penetrated into the bronchial tubes, though they must have compressed them to a considerable degree.

ART. VI.—*Researches on the Brain, Spinal Chord, and Ganglia; with remarks on the mode by which a continued flow of Nervous Agency is excited in, and transmitted from these organs.* By JAMES STARK, M. D., F. R. S. E., Fellow of the Royal College of Physicians of Edinburgh.

No set of organs in the animal body is more worthy of a deliberate examination by the physiologist, pathologist, and medical practitioner than the centres of the nervous system. They are the organized structures in which the soul or living principle more immediately resides; they are the centres to which all sensations are transmitted; in which all the acts of the will originate; the parts which regulate the motions of all the other organs of the body. It is perhaps not over-estimating their importance to state, that no function of any organ can be deranged, no sensation be in-

creased or diminished, in fact, no derangement of health be experienced without in some way or other affecting these organs. And, on the other hand, the structure or functions of these organs cannot be in the slightest degree injured or deranged without giving rise to many and varied disorders, first, of function, and then of structure in the various organs of the body. Though these principles are recognised by all, and these organs have been often carefully examined, it is also generally agreed that much still requires to be known regarding them; and we do not at the present day possess any very satisfactory information regarding their minute anatomical structure, the mode by which they regulate the voluntary and involuntary acts, and the general or special sensations, or even regarding the chemical composition of the different structures found in them. To each of these subjects the attention will be directed in the following paper, and in the remarks which follow on the practical application of the subject, especial care will be taken to draw no conclusions but what seem fully warranted by the facts.

1. *Chemical Analysis of the Brain.*—Many analyses of the brain have been published, the most recent as well as the most minute of which are those of M. Couerbe* and M. Fremy.† M. Couerbe recognised the existence of several fatty matters, to which he gave the names of cerebrote, cholesterine, cephalote, stearoconote, and eleancephalote, besides albuminous residue, much water, phosphorus, salts, &c. M. Fremy, on the other hand, regarded these substances described by M. Couerbe as impure and compound bodies; and the results of his analysis showed the fatty matters of the brain to be composed of a white matter which he termed cerebrie acid, of a particular acid which he calls oleophosphoric, of cholesterine, of margarine and olein, and the usual fatty acids. Berzelius's analysis simplifies still further the constituents of the brain, for he reduces the fatty matters to three, viz. cerebral stearine, cerebral olein, and cholesterine. Berzelius considered the gray and white matters of the brain as identical in chemical composition.‡ John states, as the result of his analysis of the gray and white matters, that the gray contains less water and more albumen than the white.§ He also met with no phosphorus in the gray matter. M. Lassaigne, in 1835,|| states, as the result of his analysis, that the gray matter contains much of the red fatty matter of Vauquelin, but little of the white fat; while the reverse is the case with the white substance of the brain. M. Fremy, on

* Annales de Chimie et de Physique, June 1831, p. 160.

† Journal de Pharmacie, 1841, Vol. xxvii. p. 453.

‡ Traité de Chimie, Paris, 1833, Vol. vii. p. 9.

§ Chemische Tabellen des Thieriche. Berlin, 1814, p. 74.

|| Journal de Chimie, August 1835.

the other hand, found that the white substance of the brain contained all the fatty matters, whereas the gray contained merely a trace.

My own analysis of the different parts of the brain of man, oxen, sheep, and dogs, was limited merely to the ascertaining the general nature of the principles which entered into its constitution. In the white substance of these different brains I found a large amount of fatty matters, which, before being separated from each other, remained fluid at the usual temperature of the body, but, on being several times heated, assumed, on cooling, a more crystalline form, and required a higher temperature for fusion. It was quite apparent that this matter was a variety of the fatty principle, seeing it stained paper with a greasy stain, burnt freely like other fat, formed a soap with alkalis, &c. The remainder of the white substance of the brain, apparently little changed in bulk, was found to consist chiefly of albuminous matter.

To procure the gray substance of the brain as free as possible from admixture with white matter, thin slices were cut, laid on glass, and held up to a candle. Only those parts were removed for analysis which were seen to consist of the gray matter alone. Even in this way it was found scarcely possible to procure the gray substance without a small admixture of white. The whole of the gray matter was found to be composed of albuminous matter, having merely a trace of fatty matters, which I feel inclined to attribute to the small portions of white substance, from which scarcely any care could entirely free it. I made no experiments for the purpose of ascertaining the nature of the salts, nor the exact peculiarities of the oily matters; being satisfied that, for all practical purposes, it was sufficient to determine that the white substance of the brain consisted of fatty matters and albumen, while the gray consisted of albumen alone.

The cerebellum was found to consist of the same substances as the brain itself; its gray matter similarly wanting any appreciable quantity of fatty matter.

2. Chemical Analysis of the Spinal Chord.—Few analyses of the spinal chord have been published; indeed, with the exception of Vauquelin's analysis, I scarcely know of any other which has been recorded. He found the spinal marrow to consist of fatty matter, albumen, ozmazome, and water. In my researches I found that the white substance of the chord contained the same fatty matters as the white substance of the brain and cerebellum, and that the insoluble residue consisted chiefly of albumen. It was found impossible to separate the gray matter completely from the white of the chord; but, even though this was imperfectly done, the small proportional quantity of fatty matter which was obtained showed that, had the gray matter been completely freed from the

white, it would have consisted almost entirely of albuminous matter, with only a mere trace of fat. The fatty matter of the chord appeared to be identical with that of the brain.

The ganglia from many parts of the body were analysed in a similar manner, and found to yield a much smaller proportion of fatty matter than the white substance of the brain or chord, and a larger proportion of albuminous or albumino-fibrinous matters. The fatty matter, however, appeared to possess the same properties as that of the chord and cerebrum.

3. *Microscopic Anatomy of the Brain.*—Though much has been written on the microscopic anatomy of the brain, we know little with certainty as to its true minute structure. One would have thought, and naturally expected, that as the microscope was improved in construction, the observations made by its means would be more valuable and more correct; that, in fact, just in proportion to the improvement in the construction of the microscope would be the advance of our knowledge of the true structure of the brain. Such, however, has not been the case,—nay, more, it appears to me that the fathers of the microscope, Malpighi and Leeuwenhoeck, whose observations were all made with simple crystal globules, arrived at as true a knowledge of the structure of the brain as the most able microscopists of the present day, aided by the finest of instruments.

Malpighi failed at first to detect the structure of the gray substance of the brain, but after an examination of the spleen, liver, and other glands, he returned to it, and states that he ascertained it to be composed of a congeries of extremely minute glandular-looking bodies (corpuscles of the present day), pierced in every direction with blood-vessels.* The white substance of the brain he described as consisting of hollow fibres (or tubes,) which terminated by roots in the gray matter; and that these hollow fibres were filled with a fluid which he thought was nothing else than the serum of the blood.†

Leeuwenhoeck showed that the white matter of the brain was fibrous, and that, from pressure against each other, these fibres assumed a quadrangular or hexangular form, and ran in parallel lines. In the cod-fish he repeatedly satisfied himself that these fibres were hollow, were in fact tubes, and he hence inferred that in all other animals they were hollow also. It is difficult to ascertain from his descriptions what were his exact ideas relative to the gray or cortical substance of the brain. In one passage, however, he describes and figures it as composed principally of blood-vessels holding a certain horizontal course.

* Malpighii Opera Omnia, sectio "De Cerebri Cortice," p. 79. Fol. Lugd. Bat. 1696.

† Ibid. sect. "De Cerebro," p. 4.

Della Torre described the gray and white cerebral substances as consisting of minute globules adhering so as to form lines, and cohering by means of a glutinous fluid. These globules he described as being of different sizes in different parts of the nervous system. Prochaska agreed that the white substance did not differ from the gray in structure, and that both consisted of minute globules, which varied in size in different parts of the brain, but were held together and arranged in lines by means of a peculiar elastic substance, or by a very fine cellular tissue. Malacarne, Metzger, Soemmering, the two Wenzels, Sir E. Home, Bauer, Milne-Edwards, Weber, Arnold, &c., followed Della Torre in describing the cerebral substance as composed of globules mutually cohering by means of a viscid jelly, so as to form lines, or beaded fibres.

Ehrenberg* was perhaps the first of the modern inquirers who challenged the observations of Della Torre, Edwards, Home, &c., and asserted that the globular structure of the brain was a mere deception, the product of maceration and compression. He described the white substance of the brain as composed of delicate tubes having dilatations at intervals, which caused them to resemble beads strung loosely together, and having their interior filled with a fluid which he termed the nervous fluid. As these tubes approached the surface of the brain, or the gray matter, they lessened in diameter, so that in the gray matter they resembled very fine threads with scarcely apparent dilatations. The more recent observations of Treviranus,† Valentin,‡ Leuret,§ Mandl,|| &c., demonstrate that these varicose dilatations are produced by the handling of the tissue, and that in every case the tubes are cylindrical, but have apparently such delicate coats that they assume the varicose form on the slightest handling. This, they remarked, happened especially with those which appeared to belong to nerves of sensation.

As to the gray substance of the brain and spinal marrow, Ehrenberg described it as consisting of a fine net-work of minute vessels, the whole meshes of which were filled with a fine granular matter, in which were lodged grains of a large size in nests (ganglionic corpuscles), and the whole pierced by cylindrical and varicose tubes, the continuations of those of the white substance of the brain. According to Valentin, these last do not exist in the gray cerebral matter, but in a yellowish-coloured portion, which, he says, exists between the white and the gray. He therefore

* Ehrenberg, in Poggendorf's *Annalen der Physik*, vol. 38, 1833.

† Treviranus, *Beiträge zur Aufklärung des organischen Lebens*. Breme, 1836.

‡ Valentin, *Valentin's Repertorium*. Berne, from 1836 to 1841.

§ *Anatomie Comparée du Systeme Nerveux*. Paris, 1839.

|| *Anatomie Microscopique*. Paris, 1841.

regards the gray matter as composed entirely of minute blood-vessels and of minute globules. Treviranus, again, recognises very fine tubes in the gray matter, which are associated in bundles, and that four or more of them go to form a single tube in the white substance of the brain. Purkinje, Gerber, Remak, &c. also recognise the existence of nervous filaments, a fine granular matter and interspersed larger globules, and a fine vascular web in the gray matter of the brain. Mandl recognised two amorphous substances in the gray matter of the brain,—one of a gray colour, finely granular, fluid in the living brain, but becoming irregularly coagulated after death,—the other a white amorphous semiliquid fluid, which easily divides into drops. He also detected round corpuscles provided with a nucleus on the surface of the gray matter, which, as they receded from the surface, assumed all the intermediate changes till they became what were described by Ehrenberg as the ganglionic corpuscles.

Ganglia have been recognised to contain the same corpuscles as the gray matter of the brain, and the primitive tubes either cross through them directly, or form plexuses within them. They are also abundantly supplied with blood-vessels.

The mode in which the primitive nervous tubes terminate in the brain and spinal chord has not been satisfactorily ascertained. Valentin, who thinks that all nerves terminate by loops in all situations, asserts that he has seen them thus terminating in the brain, but others have not been able to detect such an arrangement. Valentin and others have described all the primitive tubes of the spinal nerves as being continued up to the brain, and not as terminating in the chord itself. M. Baillarger, on the other hand, demonstrates that the cortical substance of the brain is disposed in layers alternating with thin layers of white matter,—an arrangement which had been previously, though partially, noticed by Vicq-d'Azyr, Meckel, and Cazauvieilh. Under the microscope it appeared to Baillarger that the white central mass terminated in the gray by fibres which penetrated through several of the layers of white and gray substance, the ultimate tubes presenting bulgings where they penetrated the white layers. The white or horizontal layers he found to consist of fibres running in the same direction as the layers, or horizontally crossing the others.

Such, then, is a short sketch of the present state of our knowledge of the minute structure of the brain and spinal chord, and I shall very shortly detail the results at which I have arrived from an examination of the brain and spinal chord of man, oxen, sheep, dogs, and a few birds.

The *white substance of the brain and spinal chord* was in every case found to be solely composed of extremely fine tubes filled with an opalescent fluid. These tubes were in the recent state perfectly cylindrical, but as the moisture evaporated from

the thin slice under examination, their contents were seen to escape at their cut orifices, and the tubes became shrivelled or unequally dilated at intervals. When the slice was compressed between plates of glass or mica the tubes were almost always rendered more or less varicose, evidently in consequence of the compression acting unequally on the tube, and partly evacuating its contents. When the fluid escaped from the tubes at the edge of the thin slice it often formed a globule of fluid, which soon assumed a granular look, and, by its high powers of refraction, showed itself to consist of an oily or fatty matter. Immersing the slice in sulphuric ether was found to remove all the contents of the tubes, and, as the ether evaporated, the tubes shrivelled and assumed the appearance of a mass of parallel threads of filamentous tissue. When this dried and shrivelled mass was immersed in water the tubes swelled out, became filled with water, and were again seen to be perfectly cylindrical. These facts were always best ascertained in the perfectly recent brain, before it had cooled. And the same was true of the spinal chord.

The next point of importance was to ascertain how these cerebral tubes terminated; and as this seemed to be a point which no observer had succeeded in unravelling, I used every means to avoid fallacy in my observations. Thin slices of the brain and cerebellum were therefore put between plates of glass, and, without being subjected to any pressure which would injure their structure, were carefully examined by the naked eye before a bright gas light. The different transparencies of the white and gray substances enabled the limits of the one to be accurately distinguished from those of the other. The white matter appears opaque, the gray matter transparent; and prolongations or fibres of the one within the other are shown by different degrees of opacity.

The gray matter of the brain was in this mode of examination seen to be divided into two, sometimes three, distinct layers, by thin bands or layers of white matter, which followed the general form of the convolution. The layer of gray matter next the surface was the most transparent and also the broadest; the one or two next the central mass of white were much less transparent, and, in especial the middle one when it was present, of no great breadth. The central mass of white matter presented the distinct appearance of sending radii through that layer of gray matter next it to the horizontal or transverse band or bands of white matter, so that when examined by reflected light it seemed surrounded by a radiated brush or halo, with a dark circle of white substance near the termination of the halo. Occasionally an extremely thin layer of opaque matter (white substance) seemed to compose the superficies of the convolution. In very many sections examined in this way a blood-vessel (artery) was seen to rise

upwards in the centre of the convolution, and send off numerous branches right and left. The horizontal layer or layers of white substance could, by transmitted light, be traced continuously from one convolution to the other.

The cerebellum examined in the same way presents a somewhat analogous arrangement, only I have never observed more than one transverse or horizontal band of white dividing the gray matter into two layers. In many cases even this is by no means distinct, and the white matter seems simply to terminate as a whitish radiated halo in each of the lamellar convolutions.

Now there can be no fallacy in these observations, seeing that no instrument was employed which could produce deceptive appearances. Unless, therefore, the microscope, whatever one it be, can detect the cause of this appearance, the observations must be held to be fallacious. Having been accustomed to use the simple forms of microscope for a period of nearly twenty years, I first examined very fine slices of the brain by means of simple lenses and globules of crystal, lenses of garnets, and doublets, magnifying from 30 to 1000 diameters. And by using higher and higher powers, and afterwards proceeding from the more simple to the more compound instruments, I am induced to believe that I have pretty satisfactorily unravelled the true structure of the brain. Most microscopists destroy all the natural structures by bruising what they examine between plates of glass or mica. This was never done till the structure was as satisfactorily made out as possible, and then was carefully done in order to procure that amount of transparency required for powers above 300.

When a very fine slice of a convolution is made perpendicular to its surface, the tubes of the white matter are seen to separate into bundles as they approach the gray, each bundle being separated from the adjoining ones by slender prolongations of gray substance. As these bundles penetrate the gray matter they separate into their primitive tubes, in which condition they traverse the horizontal or transverse layer or layers of white matter. All, however, do not appear to advance so far. Some seem to terminate before they reach it; others again pass quite through it, and terminate immediately beyond it. In no case, however, have I been able to detect these tubes crossing the external or principal layer of gray matter. These tubes gradually taper to their extremities from the point where they leave the solid central mass of white substance. The transverse layer or layers of white matter are composed of tubes running transversely, with reference to the terminal tubes of the central white substance. The consequence of this arrangement is, that where the terminal tubes of the central white matter cross these transverse layers, a regular cross net-work of tubes is produced, yet so that no union of tubes

takes place. When the section is made somewhat obliquely, this appearance may sometimes be seen so distinctly as exactly to resemble the cross threads of cloth in their disposition.

Between the convolutions no tubes radiate from the central mass of white. The tubes at this point are seen running parallel with its free edge, or forming plexuses difficult to trace; and the gray matter at this point has scarcely any adhesion to the white, and may be removed from it by gentle pressure without tearing any structure. It is only on the rise and top of the convolution that the intimate union of gray and white matter takes place.

In almost every brain a microscopic layer of white tubes forms the epidermis as it were of the brain. They follow the bend of the convolutions, and seem to have no connection with the central white matter, nor with the transverse layer or layers. It is impossible to account for Valentin's assertion of the termination of the nervous tubes of the brain in loops. It is quite possible, however, that Valentin may have been misled by having examined a section of a convolution near its termination, where the superficial layer of tubes, as well as the horizontal layer of white substance, would be seen rising on one side and descending on the other as loops. These layers, however, simply follow the bend of the convolution from one to the other; and their chief function would seem to be to put the whole parts of the brain in communication with one another.

In the cerebellum the central tree of white matter terminates by slender branches in the lamellar convolutions. These prolongations terminate in the gray matter in a brush of radiating tubes, which occupies all that space seen as a halo round the central mass of white substance. Near their termination they are crossed by a thin transverse layer of white tubes, which have the same course and apparent uses as the transverse layers in the brain proper, viz. to connect directly together the various convolutions of the organ. Enveloping these radiated terminal tubes of the central white matter, and the transverse layer, is a pretty thick layer of gray matter which extends to the very surface of the cerebellum. At least, I have not yet succeeded in demonstrating any appreciable layer of white tubes on the extreme outer surface, forming an epidermic layer, like what occurs in the brain proper. A few tubes of white matter do occur, but these were never seen in such numbers as to form a regular layer.

From this it will be apparent that the higher powers and more perfect forms of microscopes explain the appearances seen with the naked eye,—a circumstance always to be desired where compound instruments are used.

On reflecting on this peculiar disposition of the white and gray cerebral substance, it was impossible not to admire the mode

which nature has adopted to increase the surface of the gray matter, so as to allow this peculiar arrangement to take place. It must be apparent that if the gray substance had merely covered the brain as a cortical expansion, there would have been no room for this radiated distribution of the tubes of the white substance. But in both brain and cerebellum we not only find the gray matter expanded over the surface, but it is thrown into numerous convolutions, which dip more or less deeply into the substance of these organs. Indeed, it appears to me that one of the chief uses of the convolutions is to increase the *surface* of the brain. The gray matter is, however, not confined to the surface, but also occurs in certain internal parts of the brain, as in the optic thalami, &c. In the cerebellum, on the other hand, it might almost be said to constitute the chief volume of the organ, so deep are its indentations, so numerous its convolutions, so apparently lamellar or lobular its disposition. The disposition of the white substance in this organ is so peculiar on a transverse section, that anatomists have been led to style it the "*arbor vitæ*." The tree thus formed by the white cerebral substance has the extremity of its every branch enveloped in a covering of gray matter, from which circumstance it happens that every nervous tube is expanded or buried in a free portion of gray matter.

I have already stated that the white substance of the spinal chord was found to be composed of extremely fine cylindrical tubes, resembling those of the brain. It is commonly asserted that these tubes have a longitudinal direction, and are continued through the whole length of the chord to the brain. This, however, is not the case. Reason alone shows it cannot be the case; for the brachial plexuses of both sides, if formed into a single chord, would form one more than twice the diameter of any section of the chord above their origin. Where in this case would the whole intercostal, lumbar, but especially all the great leash of sacral nerves, be packed to find their way to the brain?

The examination of a longitudinal section of a very recent, still warm spinal chord, at once served to clear up the mystery. When the sides of the section were put on the stretch by means of needles the surface exhibited a fibrous appearance to the naked eye; the fibres appearing to run not directly across in the line of traction, but very obliquely upwards. When the same slice was examined by different powers of microscope, single, compound, and achromatic, it was seen that the ultimate white tubes had two directions. An outer, or it might be called cortical layer, seemed to have a longitudinal direction; while the great mass of the white substance was composed of tubes which ran obliquely upwards and inwards towards the central gray matter, as was indicated by gentle traction

on the margins of the slice. In the gray matter these tubes terminated, as had been observed, in the gray matter of the brain; and it was interesting to remark how beautifully nature had modified the arrangement of the gray matter, so as to permit of this mode of termination taking place. In the brain we have seen that the gray substance forms the cortical layer; here it forms the central pillar; yet even here it is so constructed that it forms reverse convolutions within the white substance of the chord. This may be seen by making a transverse section of the chord at almost any point; for though the minute form differs in different parts of the chord, its general form is represented in the adjoining figure,)-(. Abundance of room is thus left for the termination of the tubes in the gray matter, as from the deep indentations of the central gray substance every white tube can terminate by imbedding its extremity in a free portion of gray substance. The anterior cornua of the gray substance being narrow, are consequently almost completely transversed by the radiated or fimbriated arrangement of white tubes; but the posterior cornua being broader, all their central parts consist of gray matter alone, as the white tubes only penetrate a short distance on every side.

From this description it will be apparent that the brain and spinal chord resemble each other in two striking peculiarities. *First*, that the great mass of nervous tubes bury their free extremities in the gray matter; and *secondly*, that a certain number of tubes have the special function of connecting distant parts of these central organs with each other. Thus the longitudinal tubes of the spinal marrow not only serve to connect the different portions of the spinal chord with each other, but also with the brain; whilst in the brain and cerebellum the transverse layers of white tubes connect the whole convolutions of these organs together. We can thus satisfactorily account for any supposed reflex function, as well as for the intimate connection always remarked to exist between every part of the great centres of the nervous system.

The Gray substance of the Brain was found to consist essentially of an intricate arrangement of minute blood-vessels with excessively delicate coats, and of a granular, viscid, jelly-looking albuminous matter. It appears to me that it is of very little consequence whether we consider this gelatinous base of the gray matter as simply composed of organic granules, or as being, in addition, interspersed with larger globules like those which Ehrenberg calls ganglionic globules. I find that in the recent warm brain the whole of the granular base of the gray matter consists of a semifluid viscous matter, in which all the granular molecules are apparently of the same size. If a plate of mica be pressed

over a thin slice, the gray semifluid mass becomes agglomerated into oval or globular masses; but sulphuric ether and alcohol dropped between the mica plates resolve these masses into the original organic granules, which may then be seen floating off as distinct, excessively minute globular granules, about the 30,000th or 36,000th part of an inch in diameter. If the slice be taken from a cold brain, the whole surface of the slice is seen covered with oval-shaped globules, or ovals terminating by one extremity in pointed tails. Many of these present the exact description of those called ganglionic globules by Ehrenberg; but what first opened my eyes to their true nature was the circumstance of finding that, however the slice was cut, the tails of all these particles invariably followed the trail of the knife; and if, after examining the position and counting the number of these particles, the needle was gently passed across it, the tails of the bodies again followed the trail of the instrument, and their number was often more than doubled. By doing this below the microscope I at once saw how these bodies were formed. The viscid granular base adhered to the needle, and was drawn into drops, which were left on the surface of the slice. The reflections and refractions of light on these raised viscid drops caused the appearance described. When these drops were thus once formed they were still distinguishable though a plate of mica were placed on the surface of the slice and pressed firmly down. This too was easily accounted for, because the large quantity of water in the gray matter was pressed out, and surrounded the viscid drop so as to prevent it again amalgamating with the still uninjured granular gelatinous mass. In many cases, however, the pressure caused their entire disappearance. Frequently in examining the gray matter I have met with globular appearances which, from their high refractive powers, were evidently globules of the cerebral fatty matter escaped from the white cerebral tubes.

The blood-vessels of the gray matter are undoubtedly the essential and most important part of the structure: and though several microscopists in describing the gray structure have omitted mention of them altogether, and the rest simply state that such structures are present; I thought it worth while to spend no inconsiderable portion of time to ascertain their peculiar distribution. I have not, however, completely satisfied myself that I have succeeded in unravelling the mystery, chiefly on account of the difficulty of throwing into these vessels sufficiently fine injections.

On the surface of the gray substance of the brain, it appeared to me that the minute capillaries had a very intricate retiform arrangement, and I have several drawings of this distribution. In the free portion of the gray matter, I have noticed a somewhat

similar arrangement; but both of these are possibly just modifications of the arrangement I am now about to describe, or resulted from seeing the same structure in a different section.

It ought first to be remarked that almost the whole arteries of the gray substance come from the interior of the brain, through the white substance to the gray. This is a fact which ought to be familiar to every anatomist, though I am not aware it has been particularly noticed. As the minute artery rises through the white matter, it gives off numerous lateral capillaries, which, when they arrive at the gray substance, seem to hold a straight horizontal course till they meet with one of those numerous perforating veins which are seen dipping down into every depression of the convolution. These arterial capillaries are so numerous, that, taken in connection with the arterial and venous branches, they seem to form a regular square-meshed net-work, yet so that arterial blood alone circulates in the minutest branches, or, in other words, so that arterial blood alone circulates in the gray substance of the brain. Every means appears to be used to carry off the venous blood as directly as possible from the minute structure of the gray matter. The convolutions are covered with a vascular *venous* net-work, which sends minute branches dipping down into hundreds of perforations and depressions on the surface of each convolution, and the venous blood is removed by these, and thrown into the incompressible venous sinuses as directly as possible. In fact, it might be stated in general terms, that the whole arterial cerebral circulation is *within* the brain, the whole venous *without*. In no case are veins found associated with the arteries within the substance of the brain. In no case does venous blood circulate within the substance of the brain, as it does in all other parts and organs of the body.

The gray matter of the spinal chord has the same general structure as that of the brain; consisting of a reticulation of very delicate blood-vessels, the interstices of which are filled up with the granular viscid albuminous matter above described.

The ganglia, so far as I have examined them, seem to be composed of plexuses of nervous tubes penetrating a close reticulation of very delicate blood-vessels, the interstices of which are filled up with a viscid granular albuminous matter. Most observers describe the gray matter as consisting of what they term ganglionic globules; but it has always appeared to me that this appearance, which I have often seen, was produced in the same way as I have above described a similar appearance in the gray matter of the brain. I have no doubt as to the fact of many of the nervous tubes originating from these ganglia, though I have not been able to ascertain this fact so correctly as in the case of the spinal marrow. I have, however, satisfied myself that more ner-

vous tubes leave the ganglion than enter it, and it is reasonable to believe that the additional number originate within its substance.

Physiological Conclusions.

Having arrived at these facts, chemical and microscopical, I proceed in the next part of the paper to point out a few of the physiological conclusions to which these investigations lead.

It is the prevalent belief of the present day that the nervous energy is nothing else than a species of electricity or galvanism; and the brain, as the great central organ of the nervous system, has in consequence been regarded as acting the part of a galvanic battery, where the electric nervous fluid was generated, and whence it was distributed over the whole body by means of the nerves. In the Edinburgh Medical and Surgical Journal for October 1844, I endeavoured to refute this idea, and from a reference to the researches of different physiologists, as well as to my own, proved that such a view was quite at variance with reason and observation. I showed from a reference to the structure of nerves, and to direct experiment, that nerves were non-conductors, or at least worse conductors of electricity than any other tissue of the body; and that their action was excited as readily by every kind of mechanical agent as by electricity or galvanism. I then endeavoured to prove that their structure showed that they were simply fitted for the transmission of an impulse, wave, or vibration; and demonstrated by a reference to many of the phenomena of the senses, that this was the only way in which the knowledge of the external world could be transmitted to the brain.

But, it may be asserted, though the nerves are non-conductors of electricity, and only act by transmitting a vibration or wave through their fluid oily contents, the brain and spinal chord may generate electricity, and thus excite the nervous energy like electricity applied externally. Were this the case the brain would be found to possess the power of generating electricity in a superior manner to all other organs of the body; but this is so far from being the case that the brain is found to generate less electricity than most of the other tissues of the body. This fact was fully established by M. Matteucci. In his first experiments* on the centres of the nervous system, from finding that a certain amount of electricity was developed from them when arranged as a voltaic pile, he felt inclined to infer that the nervous centres were generators of electricity. As he pursued his experiments, however, he was not a little surprised to find that muscles develop-

* Comptes Rendus des Seances de l'Academie des Sciences, 24th Feb. 1842.

ed this imponderable agent to a very much greater extent.* This therefore overturned his original theory, at the same time that it served to prove that whatever was the mode by which the brain acted on the nerves, it was not by virtue of an electrical agency.

If we contemplate for a moment the structure of the brain and spinal chord, we shall see that there are two distinct structures in them, structures which must possess very different functions. We have, first, the white matter, composed of delicate tubes filled with a fluid, and these tubes, generally speaking, communicating with those of the nerves. The white substance of the brain and chord may therefore be regarded as the continuation of the nervous tubes. We have, in the second place, the gray matter, composed essentially of fine reticulations of capillary arteries and granular albumen, in which the nervous tubes of the white substance terminate. From this distribution, therefore, it must be perfectly evident that the one structure, viz., the white substance, is simply an organ of conduction, and that the active agency of the nervous system must take its origin from the gray matter. As it was shown in my paper "on the Nature of the Nervous Energy," that the function which the nerves perform, is the conduction of an impulse, vibration, or wave through the fluid filling their tubes, and as the white matter of the nervous centres is but the continuation of these tubes, this must also be the function of the white matter of the brain and spinal chord. We are hence naturally led to infer that the gray substance of the brain must be the more immediate seat of the soul, mind, or living principle, seeing that every nervous tube leads up to it, and there terminates.

In my paper "on the Nature of the Nervous Energy" it was fully demonstrated that it was not a current of electricity, or of any agent in the least analogous to it, which was transmitted through the fluid filling the nervous tubes, but simply a vibration, undulation, or wave. In seeking, therefore, to arrive at the nature of the functions of the gray substance of the nervous centres, we have simply to seek for some cause which shall be capable of giving rise to an impulse, undulation, or vibration of the nervous fluid to enable us to explain all the phenomena of voluntary and involuntary motions.

In considering the functions of the brain, therefore, the remarks which follow will be limited to two points essentially distinct, viz. the cause of the origin of that impulse which leads to the production of voluntary motion; and the cause of the origin of those impulses which give rise to the involuntary and never-ceasing motions of the living animal frame. The *first* being under the influence of the will is only occasional, and consequently not necessary to the maintenance of life. The *last* being con-

* Annales des Sciences Naturelles, August 1843.

stant, uninterrupted, never ceasing from the first moment of existence to life's latest throb, are consequently essential to the continuance of animal life,—are vital. The first will therefore be denominated *Voluntary impulses*, the latter *Vital impulses*.

1. *Voluntary Impulses.*

It must be apparent to all that voluntary impulses, originating in consequence of a mental effort, must be of a perfectly different nature from those which continue independent of the will, and even after consciousness is destroyed. The impulses, then, whatever they be, which are generated on a mental effort, have alone to do with the voluntary motions; but nothing with the involuntary motions, nothing with the sensations. In the present state of our knowledge we are not likely to arrive at any satisfactory conclusions relative to the causes and nature of this form of impulse. Before we could do so we would require to know something regarding the mysterious connection of mind with matter, soul with body; and we would also require to know something of the nature of the mind, soul, or living principle itself. This, however, is perhaps one of the mysteries which shall be for ever hid from us; the consequence of which is, that, after a continued examination, I have been obliged to leave the cause of the voluntary impulses in a not much more satisfactory state than that in which I found it. It may still, however, be satisfactory to show what it is not.

If the gray substance of the brain generated electricity on a mental impulse, and this electricity, by its discharge over the origins of the nerves which led to the part we wished to move, excited a wave or vibration in the fluid of the nervous tubes, it would satisfactorily explain all the phenomena. It is a possible supposition that the mind has such a power over the gray substance of the brain, yet it is not a likely one. If the cause of the voluntary impulse were the generation of electricity it would naturally be expected that some structure would be present in the brain and spinal chord, which would prevent the electricity formed in one convolution, or limited portion of the brain or chord, from being carried off and distributed over the whole surface of these organs. In other words, we should find the whole brain and spinal chord divided into distinct cells or compartments, with walls of some substance which was a non-conductor of electricity, and each set of nerves which acted on any particular muscle confined to one such cell. As no such divisions, however, are found; as the gray substance of the brain forms a continuous expansion over the whole surface, and is continuous through the whole length of the spinal chord, it is reasonable to infer that it is not electricity which is the cause of the voluntary impulses. Besides,

if a mental impulse could generate electricity, what prevents the mental impulse from itself originating the vibrations or undulations in the fluid of the nervous tubes? This would seem to be much more in accordance with the simplicity of Nature's works in everything around us, and I can see nothing irrational in the belief that the will, mind, soul, or living principle directly excites the voluntary impulses. This, then, would be an additional argument for the conclusion above stated, that the soul or living principle must have its more immediate seat in the gray matter of the nervous centres; and when we see all the nervous tubes terminating at or in this gray substance, the conclusion may be regarded as demonstrated.

We shall now turn to the consideration of the more important and hitherto still less known agency which is the cause of the excitation of those continued impulses of the fluid of the nervous tubes which give rise to the uninterrupted involuntary motions. These I term

2. Vital Impulses.

It is by these impulses that the heart is stimulated to continue its ceaseless beat; it is by them the chest is excited to renew its uninterrupted heavings; the bowels to perform their constant vermicular motions of contraction and dilatation; the liver, the kidneys, and other glands and organs silently but uninterruptedly to perform their assigned functions. In a word, it is by their continuance that life is maintained—by their cessation that life is extinguished. The subject, therefore, is one of the most mysterious of the works of nature, and one which has hitherto eluded the grasp of the philosophic inquirer. It becomes us, therefore, to proceed with all due caution in the inquiry, and never allow any theory to run away with the facts; but to deduce a theory from facts which have been well ascertained.

Whatever be the theory which may be adopted relative to the exciting cause of the impulses of volition, it may with perfect safety be affirmed that it is a very different agent which must be the cause of the excitation of that ceaseless flow of nervous impulses which must be conveyed to the organs of involuntary motion. Supposing even that the vital principle or soul excited impulses in the nerves of volition, by means of a development of electricity, it could not so act on the origins of the nerves of involuntary motion, as these are independent of the will, and not capable of being controlled by it. Besides, all the arguments against electricity exciting impulses apply with tenfold force with regard to the involuntary motions, and demonstrate that it could not be the cause of the impulses which excite these motions. Thus the ganglia are not even isolated, as are the brain and spi-

nal cord, so that we could not for a moment conceive that electricity could be generated in them without being instantly carried off as fast as it was generated by the adjoining membranes, which are all good conductors of electricity. Again, in those animals whose bodies possess the power of generating electricity, the apparatus provided for that purpose is most abundantly supplied with nerves of large size, and yet, after the animal gives a few shocks, it becomes quite exhausted, and loses for a time the power of generating electricity. The organs of involuntary motion, however, are supplied by very few and slender nerves, and yet the nervous energy of the part never becomes exhausted so long as life continues. There is not, therefore, the slightest analogy between the phenomena in these two cases; and, what is more to the point, there is not the slightest similarity of structure between the electrical apparatus and the gray substance of the brain, spinal chord, or ganglia.

It must, besides, be remembered, that, if electricity generated the vital impulses, it would not only be necessary that the generation of electricity should be unceasing, but that it should also be interrupted. Take, for instance, the example of the heart. To excite it to contract there would require to be a generation of electricity, which by its discharge would produce an impulse or vibration in the fluid of the nervous tubes leading to that irritable muscle. There would then require to follow a pause or rest, to allow that organ again to dilate. This would therefore necessitate that the electricity should be accumulated in the gray matter of the nervous centres and discharged in interrupted but regular shocks. This, however, could not take place for the reasons above assigned, as the electricity would be carried off by the adjoining membranes, &c. before it had accumulated to any appreciable extent.

From all these circumstances, therefore, it may be very safely concluded that electricity is not the cause of those vital impulses of the fluid of the nervous tubes, which give rise to the involuntary motions. Neither can they be ascribed to the will or soul, as these vital actions go on when both sensation and the power of voluntary motion are completely destroyed, whether this results from the effects of drugs, disease, or injuries.

Seeing, then, that the agent which gives rise to the vital impulses cannot be electricity, or any analogous agent, nor the will or soul, and seeing that it must be one capable of continuing in constant operation, without fatigue, during the whole course of life, and of course must be of a very simple character, we are reduced to the necessity of seeking some more plausible explanation. As it is absolutely necessary that the theory which may be proposed correspond closely with the facts above stated, relative to

the minute anatomy of the nervous centres, it would be well to bear in mind the minute structure of the gray matter, and its relations to the white substance.

It was found that the gray substance of all the nervous centres was composed of a net-work of delicate capillaries, those interstices were filled up with a granular albuminous matter, and that in this net-work the extremities of all the nervous tubes terminated. One corollary may be drawn from such a structure, and that is, that a stream of vital fluid, coursing in a particular manner over the terminal extremities of the nervous tubes, is necessary to the production of the vital impulses.

If we cast our eye over the numerous vessels entering the skull, and consider their large size and peculiar distribution, we cannot avoid the reflection that nature, who does nothing in vain, must have destined these to perform some very important function. Had this not been intended, she would never have sent such an enormously disproportioned quantity of blood to such an organ, nor have used such curious devices to prevent the circulation of the blood there from meeting with any retardation. One circumstance which must strike every inquiring mind, is the extreme care taken, that the vessels which enter the skull shall not undergo any compression, any diminution of calibre. Thus the vertebral arteries enter the hollowed processes of the cervical vertebræ the moment they reach the spine after their origins. They are continued in these bony canals till they reach the skull, where every care is taken by their twisting, their distribution, and the large calibre of the hollowed canals, to prevent them from running any risk of being compressed. The two internal carotid arteries also enter the skull through solid bony canals, and are so placed in their course through the neck as to prevent their being subjected to any pressure from the surrounding parts. All this care would not be taken for a vain purpose,—all this care would not be used unless it were to serve some useful purpose.

If, again, we consider the mode in which the blood leaves the brain, after having served its purpose there, we cannot fail to arrive at the conclusion that it is the arterial blood alone which serves the useful purpose to that organ. The venous blood is collected directly from the brain into the veins of the *pia mater*, a membrane which consists almost entirely of a venous net-work of vessels, and is passed from them directly into the sinuses, or incompressible triangular canals. It is a very remarkable fact, that no veins are to be met within the substance of the brain; nor do veins accompany the arteries, as they do in every other part of the body. Arteries alone perforate the nervous matter; the veins all exist on the surface alone,—unconnected with the nervous matter. From all these facts, then, we arrive at the inevitable conclusion,

that the arterial blood must contain a something which is absolutely essential to the nervous system ; and we must next inquire what that essential something is.

Numerous are the speculations as to the uses of the arterial blood in the circulation. But I do not intend to enter into the speculative or disputed points of the subject, but merely to allude to those relative to which all are agreed.

a. It is from the arterial blood the tissues are repaired ; it is from the arterial blood the tissues are developed. This must therefore be one of the uses of the arterial blood in the brain ; but it cannot be its chief use, as it would not serve to account for the very peculiar distribution of the blood in the brain.

b. It is by the arterial blood that the heat of the body is kept up. Direct experiments have shown that arterial blood is two or three degrees of temperature warmer than venous blood ; and it matters not for our present purpose whether we consider that heat to be developed at the capillaries or at the lungs. This fact is certain, that the arterial blood which leaves the heart is warmer than the venous which arrives there. Now an enormous proportion of heated blood is sent to the brain. Is heat absolutely required to be kept up in the brain and nervous centres ? It is. Were the brain to cool even a few degrees its functions would be destroyed or very much impaired. If it cooled say even to 70° or 75° Fahrenheit, the oily matter filling the nervous tubes both of the brain and nerves would become so far solidified or granular as to unfit it for transmitting the nervous vibrations ; consequently the functions of the body would cease—life would become extinct.

This fact has been brought out very beautifully by the illustrious Chossat in his work entitled “ *Recherches Experimentales sur l’Inanition.*” He found that by starving animals they actually died “ a death attended with all the symptoms of that by cold.” Their temperatures gradually became lower and lower ; and when it became so low as 76° 8’ Fahrenheit they died. “ This,” says he, “ is the temperature at which animals die when plunged into refrigerant mixtures ; and it is therefore reasonable to infer that the cessation of life in starved animals is the consequence of the cooling of the body below what is sufficient for the purposes of life.” I need scarcely stop to remark how well such experiments are explained by, and accord with the views I promulgated as to the nature of the nervous energy, the theory of hybernation, and the structure of the nerves.

I consequently regard the warming properties of the arterial blood as one of the very important functions which it performs to the brain ; and the peculiar distribution of the nervous tubes relative to the arterial capillaries brings effectually all under the influence of the heating surface.

c. This, however, cannot be the essential something after which we are inquiring, else we should never have seen such care taken to transmit to the brain the stream of blood undiminished in force and volume; nor yet would the minute capillaries and larger arteries and veins be distributed in a manner so different from what they are in other parts of the body.

What object, then, would be gained by this peculiar mode of transmitting the blood? After a careful consideration I find that but one answer can be given, and that is, that *the pulse or wave of blood is thus transmitted directly to the brain in all its original force*. The following considerations seem to bear out this conclusion:—

1st, *The arteries all enter at the base of the skull*; and at the base of the brain the large arteries inosculate (which not is observed in other parts of the body) before they enter its substance. The impulse from the four separate arteries has therefore the same effect on the brain as if it came from one artery alone. All parts must receive it at the same moment; all in the same manner.

2d, *No veins of appreciable size are to be met with in the substance of the brain*. This fact I have alluded to above, so that I need not do more than refer to what I there stated; but the fact, which I do not find mentioned by any other, proves that it is arterial or pulsating blood alone which circulates in the brain.

3d, *The Brain does actually pulsate, and this pulsation is synchronous with the beat of the heart*. One would have thought that a fact which could be so easily ascertained would have been universally received, and in all cases recognised. This, however, is not the case; and one well-known Frenchman, the celebrated Flourens, in his recent work, entitled "*Recherches Experimentales sur les Proprietes et Fonctions du System Nerveux*," published in 1842, actually devotes twenty-seven pages in the vain endeavour to refute the fact. He, on the other hand, endeavours to prove, that the elevation of the brain is produced by the respiratory efforts;—that during expiration a partial stagnation of blood occurs in the venous system, hence the brain dilates, to fall again during inspiration, when the suction power of the chest empties the veins.

It is quite apparent from such a statement that M. Flourens is neither a practical surgeon nor accoucheur, or he never could have overlooked the fact of the dependence of the *pulsations* of the brain on the pulsations of the heart. Every practical surgeon knows, and I have repeatedly ascertained the fact for myself, that in cases of injury of the skull, where the brain is exposed, the *pulsations* of the brain are synchronous with and dependent on the beating of the heart; and the accoucheur need not be reminded, that it is by perceiving the pulsations of the brain at the soft fontanelles of the skull that he is aware of the child being alive be-

fore birth. At this period the child is still within the uterus; of course it is not breathing, and the pulsations then felt cannot depend on anything but the pulsations of arterial blood. There are, besides, many ways of ascertaining that this pulsation is synchronous with and caused by the beating of the heart, but it is unnecessary to state them here. Flourens, however, is partially right when he states that a movement of the brain is produced during the respiratory acts. This, however, is not a pulsation,—is not perceptible to the touch, but is a simple movement of gentle elevation and depression. In the infant whose fontanelles are still soft, this movement is very visible during forced or deep expirations, as during crying; but this has nothing to do with the *pulsation* of the brain, seeing that I have ascertained in every case which I have yet examined, amounting now to several hundreds, that the pulsations of the brain go on, and may be both felt and seen whilst the brain is elevated during the expiration, or depressed during the inspiration. The pulsating motion synchronous with the beat of the heart is the essential and necessary movement; the other is simply a wise provision of nature to protect the brain suffering from stagnation of blood during violent efforts or forced respirations. The latter motion can only occur when some part of the skull is injured, or not yet ossified, so that the pressure of the external air is allowed to act directly on the brain. The former must occur so long as the heart continues to beat.

Pulsation of the brain, then, synchronous with and dependent on the arterial pulse, does take place. This pulsation is not, however, confined to man or the higher animals. It occurs in birds, reptiles, and fishes, and in them is not confined to the brain, but is distinctly visible in the spinal chord and even in the ganglia, as I have had occasion more than once to ascertain. In the lower animals, again, this pulsation, synchronous with the cardiac pulsations, may without much difficulty be observed in the larger ganglia which seem to supply the place of the nervous centres. From all I have been able to observe, then, I have arrived at the conclusion, that pulsation of the nervous centres occurs in all animals provided with a distinct circulation, and a distinct nervous system; and *that* pulsation, throughout the whole range of the animal kingdom, is dependent on the pulsations of the heart.

Let us now apply these facts to the explanation of the production of a continuous yet interrupted succession of impulses in the fluid of the nervous tubes of involuntary motion, which we have seen was necessary to explain the continuous untiring action of the involuntary system of nerves.

It was shown in my paper “on the Nature of the Nervous

Energy," that the whole phenomena of the nervous system could be explained on the supposition that that agency was a transmitted vibration or impulse through the oily fluid contents of the nervous tubes. In so far as the nerves of involuntary motion are concerned, we must show that there is some agent present which is capable of exciting a continued untiring series of vibrations, from the period when distinct structures are visible in the embryo till the end of life. Such a cause we have in the pulsations of the blood in the arteries of the brain and other nervous centres,—a pulsation excited by the untiring ceaseless action of the heart—a pulsation which stops but with life itself. As this is a most important conclusion, and one which throws quite a new light on the uses of the arterial pulsations, let us examine all the facts connected with the subject as minutely as possible.

A. *The arterial capillaries of the gray matter of the nervous centres are so distributed that the pulsations of the vital fluid are communicated to the fluid in the extremities of the nervous tubes, and, through it, to the distant organs of the body.* In all the nervous centres, (brain, chord, and ganglia,) it was shown that the nervous tubes terminated or buried their heads among the arterial capillaries of the gray substance. The pulsations of the blood in these capillaries cannot fail to produce an impulse or vibration in the fluid of the white nervous tubes, seeing that these tubes possess no rigidity by which they could resist the communication of the pulsation; and this vibration of the fluid would be equally produced whether these tubes terminated in the gray matter by simple extremities, as we have shown is the case, or by loops, as Valentin supposed. Here, therefore, we have all the postulates we required,—we have the continued excitation of vibrations so long as life lasts,—we have the regular interruptions to allow the contracting organs again to relax.

B. *Any circumstance which causes the heart's action to fail or become weakened, instantly, and in the very same proportion, affects the functions of the brain and nervous system generally.* If we draw blood so as to diminish the strength of the pulsations, (or weaken the heart's action,) we produce faintness. This is just a term to express a state of diminished nervous excitation, which no sooner occurs than, just in the same proportion, the whole organs lose their capability for performing their functions. The muscles consequently cease to support the body; the limbs fail; the sensations are diminished or nearly extinguished; and a strong proof that the above is the true explanation of the phenomena is that the action of breathing and the action of the heart are diminished in the very same proportion.

If the blood-letting be carried so far that little or no blood is

sent to the brain, and consequently no impulse is communicated to the fluid of the nervous tubes, a true faint or apparent death results. Sensation, volition, and even the involuntary motions are all arrested ; and, if it be only a faint, all these in returning keep exact pace with each other.

No one has, to my mind, given even a rational explanation of these phenomena, but the following seems to explain them all. After the loss of blood, while the person is lying in a faint, the blood-vessels contract on their remaining contents by virtue of their tonicity. The evil effects of the diminished quantity of blood are thus in some measure compensated for. A quantity of blood being thus driven on the heart, it contracts on it by virtue of its irritability—a property quite independent of nervous energy, as was satisfactorily proved by M. Longet. An impulse is thus communicated to the vital fluid, weak, it is true, at first ; and it, in its turn, transmits an impulse to the fluid in the delicate nervous tubes where they terminate in the gray substance of the nervous centres. This impulse to the nervous fluid is transmitted through the nervous tubes to the heart, reacts on it, excites its contractions to new vigour, re-excites all the other involuntary organs in the same proportion, and gradually causes symptoms of life to be again manifested. Hence we see the force of the pulsations become stronger and stronger, the breathing becomes fuller and more regular, consciousness returns ; with it the powers of volition and sensation ; and, just in proportion to the fulness and force of the arterial pulsations, and the consequent impulse to the nervous centres, is the restoration of all these powers. If the blood-letting be carried a single stage beyond this,—viz. to such an extent that the tonicity of the blood-vessels cannot contract over the remaining fluid so far as to furnish enough for the heart to impart through the blood an impulse to the brain,—death is the invariable result.

These facts, then, seem to demonstrate that the conclusions above drawn are capable of satisfactorily explaining all the phenomena, and may consequently be considered as correct.

c. Arresting the passage of arterial blood to the brain produces death as instantaneously as pithing an animal. This fact can only be seen in those animals which are capable of being instantaneously killed by pithing. I have only made one experiment for the purpose of ascertaining this important fact, as it appeared to me that none of the experiments of Sir A. Cooper, Flourens, Longet, or others, on tying the cerebral artery in the neck, were performed so as to ascertain this point. These experimentalists found that the carotid arteries might be tied in dogs or rabbits without producing death, and that, in some cases, even one vertebral artery could also be tied, and yet the animal recover. When

vertebrals and carotids were both tied, the animals perished. Even in all, however, tying these arteries produced marked cerebral affections, as stupor, coma, &c.

Before performing any experiment on a living animal we ought always to know beforehand what exact object we wish to gain by the experiment. It was my object to arrest the pulsations of the arteries of the brain, and to do this instantaneously, and if possible without injuring any other organ or function of the body. Now it so happens that in the lower animals the vertebral arteries are the chief vessels which supply blood to the brain. But this is not all. They are the chief, if not the only vessels by which the impulse of the arterial beats is communicated to that organ. Not only are the internal carotid arteries, in general, much smaller than the vertebral; but in very many, indeed almost all the lower animals, as soon as they traverse the skull, they become expanded into that net-work of vessels known by the name of the *Rete mirabile*. The natural consequence of this is, that it is by the vertebral arteries alone that the arterial impulse is conveyed to the brain.

Keeping these facts in remembrance I compressed the vertebral arteries of both sides against the vertebral column in a rabbit. And instantly the animal's head dropped backward and its limbs relaxed—it was dead. I dissected it to see that no vertebra was injured but found all entire; the arrestment of the pulsations of the brain had killed the animal as rapidly as if it had been decapitated. This experiment is easily performed in the rabbit, on account of the length of the vertebral arteries before they enter the osseous canals of the vertebræ.

Though I have only ascertained the truth of the above conclusions in one case, but that a very satisfactory one, I have great pleasure in being able to refer to an unpublished paper of the late illustrious Sir Charles Bell as to the effect of pressure on these vessels causing instant death. What renders his testimony of additional value is that the experiments were performed to prove a very different point. He thought that the mode by which death was produced, when air got admittance into the veins, was by its being thrown by the circulation into the vertebral arteries, which it filled, and prevented arterial blood reaching the brain. The results of his experiments were precisely similar to my own. Stopping the circulation of blood through the vertebral arteries of rabbits caused as instantaneous death as if they had been decapitated. Sir Charles Bell's paper was read before the Royal Society of Edinburgh in March 1840; but was never published so far as I know. His experiments are referred to from notes taken by myself at the meeting referred to.

Some may object that in this experiment it was simply the want

of a sufficient supply of oxygenated blood which was the cause of death ; and, if I understood Sir Charles Bell's view aright, this was the mode in which he explained his experiments. Were this the case death ought to have occurred gradually and not been instantaneous, because the carotid arteries would still have furnished a certain amount of oxygenized blood, and death from asphyxia is comparatively a slow one. The experiment, however, clearly demonstrates that the cause of death was the arrestment of the arterial pulsation, and the consequent instant suspension of the vital impulses of the nervous fluid.

From these statements, then, it results that *the involuntary organic or vital actions depend on the fluid of the nervous tubes being kept in a state of constant vibration by means of the communicated impulse of the wave of arterial blood.* Life consequently results from the continuance of these vibrations—death from their arrestment.

Though I have apparently lost sight of the spinal chord and ganglia, I now shortly revert to them, to state that nearly all the reasonings which apply to the brain, apply equally to them. The brain was selected for illustration, as the organ in which all the phenomena were most capable of being demonstrated ; and many of them being well known were able to be adduced in proof of the correctness of the views promulgated. The disposition of the gray substance of the spinal chord and ganglia, its structure, its chemical constitution, its relations to the white nervous tubes being exactly similar, it acts in the same way, and produces the same results. It is the arterial pulsations which are the cause of the excitation of the nervous impulses of involuntary motion,—impulses which must continue so long as life lasts.

Practical Conclusions.

The practical application of these researches to the elucidation of the nature and cure of disease, would extend this paper beyond just bounds ; still a few general remarks may, with propriety be made to show its general bearings.

It has not escaped the notice of the experienced physician and pathologist, that apoplexy and diseases of the brain are almost invariably connected with disease of the heart. The statistical tables which have been published relative to apoplexy, prove that in almost every case it was the heart and not the brain which was the diseased organ, though of course the fatal effusion had taken place in the brain. No one has hitherto succeeded in explaining the connection between these two organs. The above researches, however, showing how intimately the healthy functions of the one are connected with the sound state of the other, at once serves to explain all the phenomena.

These researches also enable us not only to understand the causes of the two forms of delirium which attend so many diseases, but also furnish us with a very valuable means of distinguishing the one from the other. This is a test which was very much wanted, seeing that every day fatal mistakes are made in the treatment of disease from confounding the one form with the other,—mistaking whether the delirium proceeds from a plethoric or inflammatory tendency, or from the congestion of debility. By examining the *strength* of the pulsations of the heart and arteries, no mistake can ever be committed. If the pulse be strong and hard, no matter what may be its quickness or slowness, the delirium is invariably of that form which requires depletive treatment. If, on the other hand, the pulse be weak and compressible, no matter how quick, no matter though the delirium resemble that produced by inflammation of the brain, the disease is one requiring stimulant and cordial treatment; and unless this be attended to the patient will sink. These views, deduced from the theory which I have started, are completely confirmed by the Pathological Researches of Drs Stokes and Hudson. Dr Hudson, in an interesting communication on the epidemic typhous fever of 1840,* noticed two distinct forms of delirium, the one attended by feebleness of impulse, and diminution or even complete absence of the first sound of the heart,—the other by strong impulse, and strong and distinct sounds. On dissection it was found that in the first class the substance of the heart was softened, and the veins of the brain were congested with blood, and it was these cases which required stimulation;—in the other class the substance of the heart was firm and contracted, and the arteries of the brain were injected with blood; and it was in his class that depletive measures proved of the greatest utility.

These pathological observations then are in fact an *experimentum crucis* of the truth of the theory which I have started.

In the course of many diseases of the chest, indeed in all in which the heart is involved, head symptoms,—or symptoms imitating inflammatory attacks of the brain, are of frequent occurrence. This is always an unfortunate complication, but is never recognised to be connected with the affections of the heart. I have several times seen the most eminent physicians prescribing for this fancied *independent* disease of the brain, as if it were a separate disease, and applying all their remedies to the head; whereas the affection of the brain was only one of the symptoms of the disease of the heart, and ought to have been treated as such. Many cases which I myself have witnessed might be adduced in proof of this statement; and it is scarcely possible to take up any work treating of diseases of the chest, and recording cases, without finding numerous symptoms related which can only be explained as above.

* Dublin Journal of Medical Science, Nov. 1841.

In many diseases of the stomach and bowels, head symptoms are a very common attendant, and these sometimes present symptoms so strongly resembling affection of the brain, that they are very often treated as such. The reason of such symptoms presenting themselves in the course of disease of the stomach and bowels is abundantly obvious. Air generates in the stomach, presses against the diaphragm, and impedes the free action of the heart. Hence the faintness, giddiness, pain in the head, &c. so very commonly complained of by dyspeptic patients; and the speedy relief which such persons experience from the administration of any simple remedy which dispels the air and prevents its regeneration, must satisfy every one of the correctness of the explanation. It has now, however, been fully ascertained that stomach disease leads at last to morbid affection of the brain, and these researches enable us to understand how this takes place.

The further development of my views on this practical part of the subject must be reserved for some other opportunity. These few examples are alone referred to in order to show that physiological researches, when properly conducted, not only throw much light on even the most recondite phenomena of the animal frame, but also on the nature, and, of course, on the treatment of the diseases to which that frame is liable. This is what can scarcely be said of the physiology of the present day. It stands almost alone among the branches of the medical science, as that one which has done less than any other to throw light on the nature or treatment of disease. Indeed, to such an extent is this the case, that I scarcely know of one practical conclusion which can be drawn from its vastly extensive repositories.

There is one other subject which must be alluded to, as affording a striking confirmation of the truth of the results above arrived at, relative to the cause of the impulse of the fluid filling the nervous tubes of involuntary motion. During the course of my own investigations I have often been led to inquire why it is that, during the growth of the embryo of all animals, as soon as we are able to detect distinct parts, we discover that there are formed simultaneously an organ performing the functions of a heart, and an organ performing that of a nervous centre. This arrangement cannot be fortuitous. It is universal, so far as I have been able to ascertain, in all classes of animals furnished with a central organ of circulation;—the ganglionic knots of the lower classes of animals performing the functions of the brain, spinal cord and ganglia of the higher classes.

This is a most important point, and one which has not been sufficiently adverted to in any publication. The heart could not continue to beat without the exciting influence of the nerves,—the nerves could not keep up that stream of nervous influence un-

less the heart were to pulsate, and communicate the pulsation of the circulating fluid to the fluid contents of the nervous tubes.

It was shown and explained in my paper "On the Nature of the Nervous Energy" that, when the animal body was immersed in water, the sensations were much blunted, apparently in consequence of the impulse or vibration of the nervous fluid being rendered more feeble from the increased pressure of the surrounding medium. In reviewing this subject in connection with the present observations of the dependence of the involuntary nervous energy on the state of the circulation, we cannot fail to admire the wise provision of nature for diminishing this loss of energy as much as possible in all those tribes which live in the water. Thus fishes have an additional muscular bulb or ventricle at the base of the aorta, to assist the powerful muscular heart and render the impulse still stronger, as the blood has to go a circuitous course through the gills before it is distributed to the nervous system or body generally. In order still further to transmit the pulsation more strongly to the nervous centres, the carotid arteries, which supply the brain, spinal chord, &c., are given off from the branchial veins before these unite to form the common aorta. From all this peculiarity of structure, then, it results that in fishes the impulse of the circulating fluid is transmitted to their nervous centres not very much diminished in force.

We know, however, that, notwithstanding all these precautions, the sensations are very much diminished in the class of fishes. This I have had frequent opportunities of observing from having kept many kinds of fishes alive at home. I have seen them wounded severely both from accident and from fighting with each other, yet they never exhibited those writhings or other marks of acute pain observed in the higher classes; and I have even seen one which had lost in fight a part of its abdomen, greedily devour food which was offered to it.

In the gasteropoda, the acephalous mollusca, and crustacea, the heart consists of a much weaker muscle, and their branchiæ are more exposed to the vibrations of the fluid in contact with them. The blood, therefore, instead of being transmitted from the heart directly to the branchiæ, is thrown *first* through the nervous system and body generally, and is then collected and passed through the branchiæ,—directly the reverse of what occurs in fishes. Now, unless the *pulsations* were of some consequence to the vital actions of these animals the circulation would have gone on as we see it does in fishes;—the blood would have been *first* sent to the branchiæ and *then* to the body. But the very fact that it does not do this shows that the pulsation performs some important function, and I trust I have satisfactorily shown what that function is.

It will be apparent, then, that the heart is the most important organ of the animal body. As it is possessed of an organic irritability which endows it with the property of contracting on irritation, independent of the nervous energy, it may be regarded as the first organ endowed with life, and the last which dies. So long as the heart continues to beat, and the brain (in the higher animals) is uninjured, the spark of life, however feebly it may be burning, may be restored. But if the heart has once ceased to beat, unless it can be roused to action by the direct application of stimuli of some kind, death must ensue. Hence the importance in cases of drowning, hanging, fainting, &c. of rousing the heart to action by electricity or any other means which will excite its irritability. Just in proportion as the pulsations of this organ become fuller and stronger, consciousness, sensibility, and all the involuntary motions are restored; for just in the same proportion is the fluid filling the nervous tubes thrown into stronger vibrations, which react on the heart and other organs, and enable them to continue their actions.

The one organ, therefore, could not perform its functions without the other. The heart could not continue its ceaseless action unless stimulated to renew its contractions at certain intervals by the impulse transmitted through its nervous tubes from the brain, chord, and ganglia; and these nervous centres could not transmit impulses at regular intervals unless the fluid contained in their nervous tubes were thrown into undulations or vibrations by the transmitted impulse of the arterial current of blood. It seems, however, a wise provision of nature for the preservation of the life of the animal, that the heart, in consequence of its own irritability, can continue for a short time to contract independent of the nervous energy. It is thus that many a life is saved which might otherwise be lost; and I have no hesitation in saying, that if, in cases of drowning, the heart was more frequently and speedily roused to action by means of electricity, the recoveries would be much more numerous.

It has thus been proved that the involuntary acts of life are due to a simple cause, viz. to the vibration of the fluid contained in the nervous tubes; but that this impulse, which gives life to the body, and enables each organ to perform its functions, is itself dependent for its continuance on one of the organs which it excites, —i. e. the heart. The impulse or vibration of the fluid in the nervous tubes is simply communicated to it in consequence of these tubes terminating in the vascular net-work of the pulsating arterial capillaries of the gray substance. We have thus a new and important function, never hitherto discovered, assigned to the arterial pulsations; and a new law laid down, which every research proves to be correct, that wherever there is a pulsating heart, there is a distinct nervous system.

It has thus, I hope, satisfactorily been proved in this, and in my paper "on the Nature of the Nervous Energy," that the hitherto unknown agent which communicates sensations of all kinds to the nervous centres, and excites voluntary and involuntary motions in the varied organs of the living frame, is a simple vibration transmitted through the fluid filling the nervous tubes. It was shown that all the sensations were produced in consequence of a vibration being communicated to the fluid by external agencies, whether this agent was light, sound, odour, sapid bodies, or contact with the solids around us. It was also shown to be probable that the exciting cause of the voluntary impulse was the direct agency of the soul or living principle itself. And lastly, that the impulses which were the exciting causes of the involuntary acts were produced by the communicated impulse of the arterial pulsations.

What a strong corroboration of the truth of that theory regarding the nature of the nervous energy which I have attempted to promulgate does the examination of all these produce! We see, from the structure of the white nervous tubes in all parts of the animal frame, whether that be in the eye, the ear, the tongue, the skin, the muscles, the heart, the brain, chord, or ganglia, that all must be acted on in a similar way, all must be excited in an analogous manner. If, then, in any one case it can be proved beyond the possibility of dispute, that it was a mere vibration which was excited in the fluid of the nervous tubes, (and this can be satisfactorily done in the case of the nerves of hearing), we are forced to conclude that it must be by the excitation of a similar vibration in the fluid of all other nervous tubes that nerves act in transmitting sensations of all kinds to the nervous centres, or the impulses of volition and involuntary motion from the nervous centres to all parts of the body.

It has been my object in the present paper to show how those impulses or vibrations were excited which originated in the nervous centres; and as the explanations above given seem not only sufficient to account for this, but also to throw light on many of the hitherto unintelligible phenomena of the animal frame both in a state of health and of disease, as well as to illustrate the beautiful connection of the circulating with the nervous systems in all classes of animals, I cannot but conclude that I have at last arrived at the true solution of the problem.

*Edinburgh, 21 Heriot Row,
Oct. 17, 1844.*

ART. VII.—*Description of a new form of Fever as it occurs in Anstruther and the Eastern District of Fife.* By HARRY D. S. GOODSIR, Surgeon. (Read before the Medico-Chirurgical Society of Edinburgh, in June 1843.)

DURING the summer of 1841, I was called to visit a man whom I found labouring under what I conceived to be the usual fever of this district. He began, however, in the course of a few days, to complain of an unusual degree of headach, which gradually increased in severity. Abstraction of blood, both locally and generally, together with shaving of the head and the application of cold, were resorted to without effect. The bowels were torpid, drastic purgatives having little or no action on them, even with the assistance of strong enemata. In a short time his skin began to assume a yellowish tinge, which quickly became very dark; the urine was of the colour of strong tea, and the alvine secretions were whitish. The tongue was coated with a yellow fur, chiefly on the centre. At first I thought these symptoms might arise from disease of the liver, but, on examining the hepatic region, nothing unusual could be perceived; and he could lie equally well on either side. He was put, nevertheless, slightly under the influence of mercury, and counter-irritants were applied externally. Under this treatment he gradually recovered, but was unable to follow his usual employment on account of the headach, which was not altogether removed for a number of weeks after the more violent symptoms had entirely disappeared. I may remark, however, that the violence of the headach was alleviated as soon as the skin became yellow.

Shortly afterwards I had another case of the same nature, which also recovered under a similar course of treatment.

Both of the above cases set in with all the symptoms of regular or simple continued fever, which was prevalent in the district at the time, and I treated them accordingly. When the skin became yellow, however, the plan of treatment was altered in accordance with the derangement of the biliary system. These two cases did not interest me much until the following season, when, to my surprise, others of the same nature became prevalent. This disease occurred only in the two neighbouring towns of Anstruther and Cellardyke; but it was much more prevalent in the latter. It is a curious fact that no decided cases of this fever occurred amongst females. There were a few cases among females where all the subordinate symptoms of this fever were present, but where the most striking, viz. the yellowness of the skin, was absent, all the other symptoms were more strongly marked.

Before giving particular cases I will state the appearances which generally present themselves in this fever; with a few remarks on the nature of the fevers which occur in this district.

The patient has in general been complaining, as in the other types of continued fever, for some days before he confines himself to the house, of rigors, general weakness, lassitude, and shooting pains throughout the body. Headach and sickness ensue, which become gradually so violent that he is obliged to confine himself to bed. The wandering pains become more fixed in the joints, and in some cases they are so violent that it almost assumes the character of acute rheumatism. The skin is dry, parched, and burning, especially in the palms of the hands, and the soles of the feet. The tongue is dry in the centre, which is covered with a more or less thick yellowish crust; the edges are moister but clammy. The patient complains much of a bad taste in his mouth, and has constant craving for sharp acid drinks. There is slight cough, which is apparently caused by the excessive dryness in the throat and mouth, or probably symptomatic of gastric irritation. The pulse, which at the beginning of the attack ranges from 100 to 120, is now gradually decreasing in frequency, but all the other symptoms remain unmitigated; a new series of symptoms now begin to make their appearance. There is great oppression in the epigastric region, slight pain on pressure, and considerable distension, which soon extends over the whole abdomen; and, when allowed to increase, the pain becomes excruciating. The bowels are very torpid, and the feculent matter is sometimes light-coloured. The urine is also observed to become gradually, from day to day, darker and darker in its colour; and, lastly, the skin assumes a yellow tinge, which becomes darker or lighter according to the severity of the attack. I have had cases where the colour was hardly perceptible; while in others it was so deep that it appeared to be almost brown. There is a constant craving for something to eat, which, when got, is loathed; and, if anything solid is taken, nausea and squeamishness ensue, together with flitting pains in the stomach and bowels, which remain until the food is vomited or passed off from the stomach. The extremities are often affected with violent attacks of cramp, and these are most frequent in the calves of the legs. Such are the symptoms of the disease as they occurred in the greatest number of cases; in some the yellowness of the skin did not appear at all, or at least to a very slight extent, but in these either the rest of the symptoms or one in particular was aggravated. In general, however, when there was any irregularity, it was in the non-appearance of the yellowness, or rather the slight appearance of it, and almost always the consequence of this was great irritability of the stomach, that organ rejecting everything

either solid or liquid. In a case presenting these symptoms the distension of the abdomen is greater, the inaction of the bowels more obstinate than usual. There is also another distressing circumstance, namely, the constant secretion of thick, tenacious sputa, which seems to be secreted in the mouth, and is described as being very disagreeable. In the commencement of this fever there is considerable difficulty in making a correct diagnosis, as at this period it has all the characters of mild continued fever of the usual type, and, to one unacquainted with its more specific character, it would be treated as such. If, however, attention be paid to the more decided character in the earlier stages of the disease, it can hardly be mistaken. In mild typhus the patient first complains of a feeling of languor and weakness in the joints, especially in the knee joints, or in the lower parts of the thighs immediately above the joints. He complains of the whole body being sore, and especially of the calves of the legs. Occasionally a case may be met with where flitting and more violent pains are felt, but this is seldom. In the gastro-duodenic fever all these symptoms are present, but in a much more violent form. The first flitting pains become shortly fixed in the joints, which also become very stiff and slightly swollen. In *typhus mitior* there is seldom pain in the epigastric region, or if there be, it is only on pressure, the patient complaining more of a feeling of weight. In the gastro-duodenic fever, again, there is always pain and a distressing feeling of distension in that region. Together with these symptoms there is the peculiar coating of the tongue, the dry yellow crust, greater nausea and headach, greater irritability of the stomach, and lastly, the obstinate constipation of the bowels. These are all earlier symptoms, and, shortly after they have fairly set in, the more marked or distinctive symptoms make their appearance, namely, the yellowness of the skin, or rather, in the first place, the light colour of the alvine secretions, and the higher colour of the urine.

In those cases when the yellowness of the skin does not make its appearance, or where it does so faintly, the distinctive symptom is the great irritability of the stomach.

The plan of treatment found most effectual in these cases was, in the earlier stages, the usual antiphlogistic remedies, such as purgatives, low diet, and, if there was any local determination, bleeding, both general and topical, was resorted to. The treatment, however, in these stages was generally passive; and it was not till the later stages that active remedies were used. When the disease went on regularly counter-irritation was always used on the abdominal region, and especially on the right hypochondriac and epigastric regions. When the urine became high-coloured or the fæces light-coloured, an alterative course of medicine was administered, and, on account of the torpidity of the bowels, strong enemata

were daily used. It was found, however, that preparations containing aloes were most useful, and that they had considerable effect in producing alvine evacuations.

CASE 1.—August 27, 1842. Donald Matheson, fisherman from the island of Skye, aged 22. Has been complaining for some days of headach, languor, and flying pains in every part of the body. The skin dry and burning, chiefly in the palms of the hands and soles of the feet; great thirst; and bad taste in his mouth. Tongue coated in the centre, with the sides of it clammy; the fur in the centre dry and crusted. During sleep he is disturbed, restless, and is very much troubled with dreams of a frightful nature. Bowels torpid; pulse 120.

He was ordered eight grains of calomel and the same quantity of jalap.

28th. No better; powder of yesterday has not operated.

Skin slightly yellow; yellowness seen most easily on the white of the eye; urine high-coloured; alvine secretions light-coloured.

29th. Headach and all the other more painful symptoms almost entirely relieved. Skin very yellow, of a bright saffron colour; thirst considerable; makes a great deal of water, nearly as dark-coloured as porter; bowels slightly moved with the saline solution of yesterday.

Two grains of calomel were prescribed.

No pain in right hypochondriac region on pressure; pulse not so frequent as when complaints first began. Great flatulence; the whole abdominal region tympanitic and painful.

30th. Better; yellowness greater; slight appetite, but squeamish after eating. Alvine secretions quite white; sleep still much disturbed.

31st. Continues better; bowels still torpid.

Six grains of calomel and twelve of jalap were prescribed.

September 2d. Much better, but weak; yellowness, instead of decreasing, is increasing in intensity. Allowed a little wine, which seems to agree with him. Is anxious to get home, and intends to go off to-morrow.

CASE 2.—August 22, 1842. Robert Anderson, fisher, Cellardyke, aged 23. Has been complaining for some time of headach, languor, and weakness, especially of lower extremities and small of back. Great thirst; bad taste of mouth; and loss of appetite. Attributes all these symptoms to great fatigue undergone some time back, and to irregular living during height of herring fishing. Had been going to sea regularly, although all these symptoms were hanging about him; and did not confine himself to bed until this day, when he was unable to get up from severity of headach. Bowels torpid.

Five grains of calomel with ten of scammony were ordered to be given immediately.

23d, 24th. Headach still violent; stomach irritable.

25th. Skin slightly yellow; headach not so violent; bowels very torpid; much sickness, stomach irritable, rejecting almost every thing that is taken.

Five grains of calomel, with fifteen of jalap, and one drop of oil of peppermint were ordered to be taken at bed-time.

26th. Pain on pressure in epigastric region; medicine has operated slightly through the night, but more freely in the morning with assistance of an enema. Leeches to be applied to pit of the stomach, and draught to allay irritability of stomach.

Effervescing draughts with morphia were ordered.

27th. Pain and irritability of stomach much relieved; bowels still bound; headach worse; skin slightly yellow; urine not high-coloured; alvine secretions almost natural. Head to be shaved.

Five grains of calomel with fifteen of jalap were ordered to be taken immediately.

28th. Much better; pulse natural in point of frequency, but weak. Four or five teaspoonfuls of whisky in water every hour. Small quantity of porter, nutritious diet.

September 14th. Has improved gradually, and is now able to go out.

CASE 3.—1842, September 2d. Chapman Laurie, fisherman, Cellardyke, aged 34. Has been complaining for some days, with all the symptoms of simple continued fever. He consulted me ten days ago about his complaints, when he got some aperient medicine, which relieved him so much at the time that he was able to go to sea the following day. The symptoms of fever have again returned, but with much greater violence. Headach; great thirst; and complains as if bruised all over the body; sleep very disturbed; eyes oppressed, heavy, and bloodshot; little or no pain on pressure of abdomen, nor distension; tongue coated; bowels torpid; pulse very frequent; complains much of want of sleep, arising apparently from severity of headach.

September 3d. Headach still violent; eyes very much oppressed and bloodshot; skin slightly yellow. Was ordered a blue pill last night, and two colocynth pills this morning, which have operated well. Complains so much of want of sleep, I determined to give an opiate, being aware that the violence of headach is merely symptomatic.

4th. Headach rather better, but still severe; slept better, and is anxious for another opiate. A few leeches to the temples. Tongue dry and crusted; pulse 100.

5th. Rather better; pulse 95, small and feeble. A third of a glass of whisky with water every hour; nutritious diet, and a little porter.

September 6th, 7th, 8th. Still keeping better, although pain of head is not removed. Skin slightly yellow; bowels very torpid. On the 7th he got one blue pill and two aloetic without effect; and on the 8th the same dose, both of which produced little effect; tongue coated; pulse from 80 to 90.

September 10th. Pain of head still continues, but not so violent. Bowels constipated still. One blue pill at bed-time, and four colocynth the following morning.

12th, 17th, 18th. Better; pain of head continues, but slightly, with sleeplessness, which is relieved by opiates; skin still yellow.

CASE 4.—Peter Murray, fisher, Cellardyke. Has been complaining for some time of weakness, pain of back and legs, sense of weight in pit of stomach, severe headach, loss of appetite, together with all the other symptoms of simple continued fever, all of which he attributed to the fatigue he had undergone during the herring fishing. They soon became so bad he was obliged to give up work, and confine himself to bed. When I first saw him on 28th August 1842, he presented all the above symptoms, and complained very much of violent headach, great oppression in the pit of the stomach, excessive pain in the small of his back, and shooting pains throughout his body. When his complaints first began, the latter symptoms were flitting, but now they are beginning to fix more down upon the joints. Eyes bloodshot; skin dry, parched, and burning, especially in the palms of his hands, and soles of his feet. Complains much of thirst and bad taste of mouth. Tongue dry, hard, and crusted; slight cough and sore throat; bowels torpid; urine high-coloured. Ordered a purgative, his head to be shaved, and a sinapism to the pit of the stomach. When visited at night the purgative had not operated; and a strong enema was ordered. He would not allow his head to be shaved, but the hair was cut short. The sinapism to the pit of the stomach had relieved the sense of oppression very much; and he also experienced much relief on having the palms of his hands and soles of his feet sponged with vinegar and water. His head is also sponged in the same way. Pulse varies from 80 to 90, but is full.

August 29th. Still suffering very much from his head; oppression of the epigastric region; and pains throughout his body, especially in his lower extremities. Enema operated freely. Another sinapism applied to the pit of the stomach. Pulse as yesterday.

30th. Pain of head still violent; oppression of the epigastric region relieved slightly; skin over the whole body very itchy; tongue dry and crusted; bad taste in mouth; great thirst; urine very high coloured; pulse 84.

31st August. Pain of head and sense of oppression in the epigastric region are relieved; skin yellow and very itchy; water very high coloured; bowels torpid; great thirst; pulse 90, more feeble. A purgative was ordered, and for the thirst, of which the patient complains very much, some saline effervescing draughts were ordered.

September 1st. Is much in the same state as when visited yesterday. Purgative has not operated. Two more powerful powders, each containing calomel, jalap, scammony, and croton oil were given, which had little or no effect; an enema was administered, which acted slightly.

2d, 3d. Continues still in the same way; pulse from 80

to 90 ; great thirst, which is relieved more by the saline draughts than anything else. Skin much yellower, being now of a deep saffron colour ; urine high coloured ; bowels still torpid. A purgative of eight grains of calomel, ten of jalap, with one drop of croton oil, to be taken at bed-time.

4th, 5th, 6th, 7th, 12th. Rather better ; and relieved of all the symptoms, excepting the yellowness of the skin, and torpidity of bowels. Thirst is still great. Blue pill and colocynth in alterative doses are now given, which operate more freely than the calomel and jalap. Pulse 74, full. A little wine, with some whisky and water, ordered occasionally through the day.

18th. The yellowness and a degree of oppression in the pit of the stomach are the only troublesome symptoms now remaining. A blister ordered for the pit of the stomach ; and the alterative course of medicine to be given up ; the mercury being only given so as to affect the mouth slightly.

CASE 5.—August 18, 1842. David Gellatly, aged 68. Has been complaining for some days of languor, bruising pains in his limbs, which are extended throughout his body. He has also suffered very much from headach, loss of appetite, pain and oppression in the pit of the stomach, with an uneasy sense of distension in his abdomen, attended by considerable borborygmus. He has been complaining of a sense of coldness over his whole body even before the above-mentioned symptoms made their appearance. This last, together with all the others, became so violent this day, when off at the fishing, that he was obliged to come on shore with another boat. His eyes are bloodshot, and have a dry glistening appearance ; his head is very much pained, and is also very warm ; skin dry and burning, especially in the palms of the hands and soles of the feet. Tongue dry and crusted in the centre, clammy on the edges ; very bad taste in his mouth ; and great thirst. Slight sore throat, attended with short dry cough ; no difficulty of breathing. Abdomen painful on pressure, especially in the epigastric region, distended and tympanitic ; extremities rather cold ; bowels bound ; pulse 100. A purgative of calomel, jalap, and scammony ordered to be given immediately.

19th. All the symptoms as before, excepting the distension of the abdomen, which is relieved considerably. The powder has operated well. Tongue much dryer and harder ; thirst very great ; respiration natural. There is a slight sense of nausea, or even sickness when anything in the way of food is taken into the stomach. Feculent matter light coloured ; urine high coloured ; pulse 100.

20th and 21st. Complains very much of pains all over the body, but especially in the lower extremities. Pain and oppression in the epigastric region much more acute, for which a sinapism has been ordered and afterwards a few leeches. Bowels very torpid. Six grains of calomel, twelve of jalap, with one drop of oil of peppermint were ordered to be taken at bed-time in form of a powder.

22d, 23d, and 24th.—The leeches were applied to the epigas-

trium, and have relieved the pain and sense of oppression in that region. The distension has also been relieved by the purgative, but is returning again to a very great extent, and seems to be a cause of much uneasiness to the patient. Skin is becoming yellow, and the sclerotic coat of the eye is very much coloured. The bowels are now inclining to become loose; the stools are copious and of a white colour. There is very considerable difficulty of making water. Five grains of calomel and a like quantity of nitrate of potass to be taken immediately in form of a powder, also half a teaspoonful of nitrous ether to be taken in water every two hours until water is made freely. Pulse 112, small and feeble; two teaspoonfuls of wine, together with a little whisky or gin, are to be given every hour. Tongue dry and hard.

25th and 26th. Bowels still very loose, and distension of the belly very great. The pain of head is slightly relieved since the yellowness began to make its appearance, it is still, however, severe; dysuria still troublesome; pains in lower extremities severe; tongue dry and hard; great thirst; pulse 102 and feeble. The quantity of gin ordered to be increased. Nitrous ether to be continued; and also a little calomel and opium to be given every night as an alterative.

27th, 28th. Pain of head rather better; tongue cleaner, but rather clammy; distension of abdomen considerable; pain of epigastrium still going on, for which a sinapism is ordered to be applied occasionally. The patient complains much of want of sleep; dysuria greatly relieved. One grain of powder of opium to be taken at bed-time as a sedative, and to be taken along with the alterative powders ordered three days ago.

29th. Bowels again bound, but all the other symptoms much relieved, except the yellowness of skin, which is still very considerable. Urine also very high-coloured; pulse 97, stronger, but still very feeble. Gin to be increased in quantity, half a glass to be given every hour in a little water. Tongue cleaner and moister.

September 2d. Still keeping better, but is very weak; appetite increasing, although slowly. One grain of quinine is ordered to be taken three times a day; pulse stronger, varies from 80 to 90.

3d, 4th, 5th. Continues convalescing, but suffers much from want of sleep, and is still troubled during his short restless sleeps with dreams which are of a frightful character. Twenty-five drops of solution of muriate of morphia to be given every night at bed-time.

October 11th. Is now very much better, but still requires the draught at bed time.

CASE 6.—September 14, 1842. Mrs O——, aged 70, has been complaining for some days back of languor, lassitude, and a feeling of weakness all over the body, which last was felt more particularly immediately above the knee joints. She has had violent headach, attended with occasional fits of sickness; the appetite is weak, and her mouth is inclined to become dry. There has been slight cough

and sore throat, but no difficulty of breathing. The most troublesome symptoms have been a painful sense of oppression in the abdomen, which is worst in the pit of the stomach.

Her eyes are oppressed and painful, and very slightly bloodshot. There is great heat in the head; tongue clammy, and the mouth bad tasted; throat slightly inflamed; cough dry and husky; respiration natural; abdomen full, distended, and tympanitic, along with considerable pain on pressure, which last is worst in the epigastric region; bowels very torpid; water high-coloured, depositing a great quantity of lateritious sediment; skin dry and burning, especially in the palms of the hands and soles of the feet; pulse 110. A purgative enema was ordered to be given immediately, with the view of relieving the distension as much as of opening the bowels.

16th. The distension was very much relieved by the enema, but all the other symptoms the same. The sickness has been gradually increasing for some days back, and it has now become very violent. The irritability of stomach is very great, rejecting almost every thing taken. Pulse 112, very feeble. Tongue dry, crusted, and hard. Thirst great. Pain in the epigastrium considerable on pressure. A saline effervescing draught was ordered to be given occasionally, both to relieve the thirst and the vomiting, and for this latter symptom, it has been found very effectual when a fourth or half a grain of muriate of morphia has been added to it. This generally relieves the vomiting in cases of the above nature for a considerable time, and if the case is not violent, sometimes removes it altogether.

17th. Vomiting still continues; headach, sickness, and pain of epigastrium; pulse 100, very weak and small. A blister to be applied to the epigastric region, and the wine which was ordered yesterday to be omitted for a short time.

18th. The pain of the epigastrium and the vomiting are considerably relieved; the bowels torpid; abdomen distended and tympanitic. A purgative enema was ordered, but the patient being averse to it, compound colocynth pill was given instead. The wine is also to be recommenced in small quantities. Pulse 95, stronger than yesterday: tongue dry and crusted.

19th, 20th. Vomiting still going on, attended with pain in the epigastrium, and painful distension of the whole abdomen; complains also very much of a great quantity of thick foetid and extremely viscid saliva, which is constantly collecting in the mouth, and which inclines to make her sick. Bowels bound; pulse 99, feeble. The compound colocynth pill, which operated well yesterday, was again ordered to be taken at bed-time. Wine also to be increased from half a tea-spoonful to three or four every hour, and to be continued.

21st, 22d, 23d, 24th, 25th. Better, although the vomiting and other abdominal symptoms are still going on. The skin, which has been of a dingy yellow colour for some days, has now become decidedly yellow. This, however, is better seen in the white of the eye and nails, which are quite yellow. The urine has from the commencement been very dark coloured, and the alvine

secretions quite white. Pulse 89, stronger; skin very dry; tongue clammy. An alterative course of medicine has been resorted to; five grains of blue pill is given every second night, with the same quantity of compound colocynth pill the following morning.

26th, 27th, 28th. Vomiting, epigastric pain, &c. are still going on, and the blue pill is found to be the cause of greater sickness, it is, therefore, given up in the meantime. The patient complains very much from want of sleep, obtaining only short intervals occasionally, which are very much disturbed with frightful dreams. Headach and sickness are still troublesome; bowels very bound; water high coloured; tongue dry, furred, and yellow. Another blister ordered to be applied to the pit of the stomach; and, as anything in the way of purgative medicine appears to cause greater sickness, a laxative enema is to be administered at bed-time, after which, if the sickness goes on, a draught, composed of twenty-five drops of solution of morphia and a little peppermint water.

There is a great aversion to the wine and other stimulants, the patient depending more on nutritious soups. The pulse is weak and very feeble, it being almost impossible to reckon it.

29th, 30th. Vomiting &c. still going on; slight delirium; pulse very feeble. Wine and other stimulants to be given in greater quantities, with beef-tea as a drink. The pain of epigastrium not so violent; feet cold, and slightly swollen; bowels more regular. Draught at bed-time to be continued.

October 8th. Considerably stronger since last report; still shows great aversion to the wine. The evening draught has become slightly nauseating, and one grain of powder of opium, combined with a little aromatic powder, has been substituted in its place. Tongue dry and crusted. Another enema to be administered at bed-time.

12th. Better, although the vomiting is still going on slightly along with the other abdominal symptoms. They have been much relieved, however, during the night, since the enema operated. The opium given in place of the draught is not effectual. The vomiting still going on, and the patient rapidly becoming worse. I called in Mr Williamson, when the following draught was recommended, ten drops of the solution of muriate of morphia, and thirty of tincture of hyoscyamus, combined with a little peppermint water. Wine and nutritious soups to be continued. Pulse 90, stronger.

13th, 14th. Vomiting recurs occasionally; pulse stronger and regular. Draught last given not beneficial. Pills of one grain each of opium, and extract of hyoscyamus are now tried. Enema to be administered at bed-time.

15th, 16th. Rather better; stronger. The saline effervescing draught, with half a grain of muriate of morphia, to be given at bed-time, instead of the pills of opium and hyoscyamus. Wine to be increased in quantity. Pulse 88, rather full; distension of abdomen relieved since the enema; the sickness is also much relieved within the last few days; urine still very high-coloured, and alvine secretions white. The alterative course of medicine, therefore,

which was given up some time ago, is again resumed ; the tongue is still dry, but not so much furred.

21st. Still continues better. The vomiting has now altogether ceased, together with the pain of the epigastric region and distension of the abdomen ; bowels much more regular ; the secretions becoming better coloured ; tongue clean and moist ; pulse natural, although weak. The saline effervescing draught is still required, along with the muriate of morphia ; and the stimulants are still to be continued, together with the nutritious soups, and diet of a more solid nature. The alterative course of medicine is also to be continued.

Nov. 14. Is now almost quite well. All medicines are to be given up, with the exception of a gentle purgative occasionally. Tonics and nutritious diet, &c. ordered.

CASE 7.—September 26, 1842. G. D., Esq., aged 82. Had severe and protracted attacks of jaundice many years ago. Has been complaining for some days of fitting pains all over his body, which are more fixed in the small of his back and lower extremities. These pains are of a gnawing disagreeable nature. Has also been complaining of languor, headach, thirst, attended with bad taste of mouth ; loss of appetite ; distension of abdomen, along with a sense of weight and pain in the epigastrium ; pulse 84 ; tongue dry and clammy ; skin dry and burning ; bowels bound ; urine muddy. A purgative of calomel and jalap to be taken at bed-time ; and a sinapism to be applied to the pit of the stomach.

27th. Still very ill, all the symptoms being on the increase. Powder of yesterday has not operated. A dose of sulphate of magnesia to be taken immediately ; the head to be sponged with vinegar and water ; and a large sinapism to be applied to the abdomen, sufficient to cover the epigastric region. Pulse 89, rather weak ; thirst great. In the evening rather worse ; medicine has not operated freely ; the evacuations are light-coloured, and the urine is of a dark colour. A strong purgative of calomel and scammony to be given at bed-time.

28th. Rather better ; powder has operated freely ; all the head and abdominal symptoms are much relieved ; the alvine secretions are quite white ; and urine of the colour of a strong infusion of tea ; pulse 78, weak, and rather small ; skin and sclerotic coat of eye are quite yellow ; a blue pill to be taken every night, and one or two colocynth pills the following morning, and to be continued. Nutritious diet, with a small quantity of brandy and water occasionally.

29th and 30th. Better ; appetite very weak ; slight nausea after food.

October 7th. Much better ; skin still yellow.

Observations.—In the foregoing cases of this type of fever, it has been my endeavour to bring forward cases where the various appearances which it most commonly puts on are most obvious.

From many causes the plan of treatment in the various cases has been also more varied than it would otherwise have been. No fixed rule, however, should be laid down in the treatment of any fever,—to be followed out exclusively in all cases,—seeing that no disease varies more, almost every case presenting some features in which it varies perhaps to a very great extent. One may require depletion, while the other, again, would rapidly sink, unless powerful stimulants were freely administered.

Regarding the causes of this particular type of fever, or rather of the yellowness, these cannot be determined with any degree of certainty. No cases in this quarter terminated fatally, so that our only certain source of knowledge was shut up; and whether there was any affection of the liver or of the duodenum alone is a question. That it was not in the former organ can almost be relied on, from all the topical symptoms, which are generally found in acute or subacute affections of that organ being absent. That the principal affection lies in the duodenum, therefore, there can be little doubt. We have the greater nausea, which is worst, shortly after taking any food, greater pain across the back, greater flatulence, and also—perhaps the most certain symptom—the pain in the epigastrium and vomiting, the affection, doubtless, extending along the mucous membrane into the stomach; and this last supposition is greatly strengthened by the fact, that these symptoms generally, if not always, become worse during the last part of the middle stage of the disease.

I am told by Professor Reid, that this same type of fever has occurred to a considerable extent in Dundee during the last autumn; and that he saw many cases of it there in the hospital, while on a visit to that town. Some cases also terminated fatally; but whether they were examined or not after death he could not learn.

I am also informed by my father, that, when he began practice in this district thirty-five years ago, continued fever, which has always been prevalent, presented the head symptoms and peculiar delirium of the fever, as it occurs in the Edinburgh Infirmary. For fifteen years it continued to present this type, and then began to assume another character. Tympanites, diarrhoea, severe headach, protracted convalescence, sudden death from peritonitis, indicated an abdominal type of fever. During the time my brother practised in this district, he had many opportunities of making *post mortem* examinations of such cases, and invariably found the solitary and aggregated glands of the ileum, cæcum, and colon diseased. This type of fever, in which the ileum and cæcum are chiefly affected, is more fatal in this district than the cephalic form of disease. In 1841–2, the type of fever described

in this paper has supplanted what I was in the habit of treating in former years with my father and brother. I believe it to be like the last, an abdominal fever, the local affection, however, being confined to the duodenum, and occasionally attacking the stomach. It appears to be the least fatal of all the forms.

In Case I. we have the disease in its regular form, that is, when all the symptoms become very mild, or disappear almost altogether, as soon as the skin becomes affected; the yellow colour coming freely out, and not leaving behind it the slightest apparent affection in any of the internal organs. The greater number of cases which came under my care went on regularly in this way, and, after the yellowness appeared in a decided form, became so far well, that they were generally enabled to follow their usual occupations in the course of a few days, the yellowness, however, generally remaining for a considerable time, in some cases even for months. The best mode of treatment in cases of this nature has been found to be, in the first stage, antiphlogistic measures, occasionally topical blood-letting from the epigastric region or back. Counter-irritants, such as sinapisms, were found to be just as effectual, without causing any loss of strength.

Purgatives—Aloetics, after trial, were found to be most effectual, assisted by purgative enemata. As purgatives require to be used with caution in this district, in any species of fever I relied more upon enemata. After these measures, alterative doses of blue pill were given, then tonics, nutritious diet, &c. Stimulants, such as wine, spirits, were resorted to in those cases only where there was exhaustion and feeble pulse, and also during convalescence.

In the second case, the yellowness never came out properly on the skin. The stomach was irritable. This case, along with all those which are irregular, is more tedious. Local depletion, along with counter-irritation, was found to be effectual in speedily removing the gastric affection, a saline sedative draught being administered at same time to allay the irritability of the stomach. The saline effervescing draughts were found to be very effectual in all the cases in relieving the sickness and vomiting.

In Case III. the head was affected to a very great extent. The yellowness could be distinctly seen in the white of the eye, but the skin was only of a dingy colour. Purgatives, enemata, and sedatives were found effectual.

CASE IV. is curious, in so far that, although the yellowness of the skin came freely out, the internal organs were not relieved. Had general depletion, however, been resorted to in the earlier stages of the disease, the patient would have been doubtless relieved more speedily than he was.

CASE V. occurred in a person of advanced years, but healthy. The case was tedious in the last, or convalescing stage, arising probably from the exposure which he underwent in the earlier stages, and probably also from his time of life. Throughout, this case presented a number of mixed characters.

CASES VI. and VII. occurred in the better classes of society. The latter, as being subject to hepatitis, is brought forward as a proof that the liver is unaffected in this disease. The former is an illustration of the disease as it occurs when affecting the stomach, which it did in this instance in a very violent form. The strength had sunk so much that all hope of recovery had been given up. The patient, from the commencement of her illness, had conceived that she was never to recover, so that it was difficult to impress upon her the necessity of using the proper remedies.

The preceding part of this paper now appears as it was drawn up during the end of the year 1842, and commencement of the following year, and shortly afterwards laid before the Medico-Chirurgical Society of Edinburgh,—circumstances which will account for those parts of it that may now be considered out of place. As particular inquiries were made at the time when my attention was first directed to the peculiar nature of the disease regarding its occurrence in other parts of the country, I was quite aware of its novelty and nondescript character, both of which circumstances induced me to make known a history of the disease as far as it had come under my own observations. By a great many professional gentlemen it was not considered as fever, and by some treated very actively as acute liver disease, and was consequently in several cases fatal.

The course of this disease through the country is by no means uninteresting. That the district to which this paper refers was the first in which it appeared there can be little doubt; during the time it was prevailing there I had many conversations with Professor Reid, as well as many other professional gentlemen from various parts of the country, regarding it, who, from their extensive knowledge, could have informed me had any similar disease occurred previously. To Dr Reid I was indebted for information regarding a notice of its occurrence in Dublin during a period in the early part of the present century, but with that exception I was not aware at the time of any other instance of its occurrence.

Shortly after its appearance in the Anstruther district, it became prevalent in Dundee, with which town there was a constant communication at the time. From Dundee it appeared to travel to Perth, and from the latter place through Fife, again, by Cupar to Edinburgh, thence to Glasgow, and so farther south, until it reached the northern districts of the western counties of

England, where it gradually disappeared. From all accounts it does not appear to have extended farther north than Dundee. I am informed by Dr Monro, that "it continued in Dundee for a long period, and it made its first appearance in August 1842, at which time it passed off for influenza for want of a better name; and it was some time after before the yellowness of the skin was observed to any extent. However it increased rapidly up to November, when it began to decline when the eruptive typhus became more prevalent, and continued very severe all the winter, during which time the bilious fever never entirely disappeared, although the number of cases were greatly fewer. About July 1843 the bilious fever was again in the ascendant, and continued all that autumn very severe up to November, when it began again to decrease; and in January we had more of regular typhus, which continued all the remainder of the winter and spring, the yellow disease at the same time never entirely disappearing until about May 1844, since which period we have had a great immunity from disease generally, but especially from fevers. For instance, the cases admitted into the Infirmary from 1st June to 1st December 1843 were 1148; whereas during the same period for the present year the numbers are only 303, of which 45 were marked fever on admission, and even several of these afterwards proved not to be fever. It was also very remarkable that the cases of yellow fever which were brought to the Infirmary, were not from those localities from which typhus generally came; but rather from the higher and better ventilated parts of the town. The mortality was at first very small, latterly it became greater, but even at its worst it was moderate. I find by examining the records of the Infirmary, that during the year 1842-3 the cases of yellow fever reported were 672, of which 7 only died, being 1 in 96; during the year 1843-4 the cases reported are 585, while the deaths are 20, being 1 in about 30.

"The fever in question did not, as far as my own observations went, and from what I can learn from others, assume a remittent form, but was continued until the period of its cessation, which was in almost every case sudden, and often with profuse perspiration. We had also almost uniformly the relapses noticed in other places, taking place about the 14th or 15th day, and generally three or four days after the cessation of the fever. These relapses did not in general remain beyond three or four days, when the patient again became convalescent. In several instances I have seen a second and sometimes even a third relapse before the patient thoroughly recovered."

From all that I have been able to learn, the fever has never extended farther north than Dundee. Dr Wiseman of Cupar Fife informs me, "I have had few or no cases of fever so marked

in its character as would entitle me to identify the disease with that of yellow fever. Of course I do not mean to say that bilious derangements, to a greater or less extent, have not been a usual accompaniment of all our fevers, and that we have not had also occasional cases with more or less of a jaundiced tint,—only that the latter, in any marked degree, has not been a usual concomitant.”

Although this disease originated on the eastern coast, the situation was apparently by no means favourable to its propagation; for the district to which this paper refers, and that of Dundee, appear to have been the only districts in which it was seen to any extent, the midland and western parts of the county having been much more affected with it. Dr Johnston informs me that it had never been heard of in Berwick-upon-Tweed, nor in any of the surrounding districts.

The disease as it occurred in Anstruther and Dundee, appears to be more similar in its characters to the Glasgow form than to that of Edinburgh. There were fewer cases of remission. In Dundee there appears to have been a considerable amount of cases assuming this form; but in Anstruther all the cases without exception were continued; the convalescent stage, however, being exceedingly tedious.

PART II.

CRITICAL ANALYSIS.

- ART. I.—1. *A Practical Treatise on Midwifery.* By M. CHAILLY, M. D., Ex-chief of the Obstetric Clinique of the Faculty of Paris, Professor of Midwifery, &c. &c. Translated from the French and edited by GUNNING S. BEDFORD, A. M., M. D., Professor of Midwifery and the Diseases of Women and Children in the University of New-York. Illustrated with 216 Wood-cuts. 8vo. New-York, 1844. Pp. 530.**
- 2. *A Practical Treatise on Midwifery; exhibiting the present advanced state of the Science.* By F. J. MOREAU, Professor of Midwifery and the Diseases of Women and Children in the Faculty of Medicine of Paris, Physician to the Lying-in Hospital of Paris, &c. &c. Translated from the French by THOMAS FORREST BETTON, M. D.; and edited by PAUL B. GODDARD, A. M., M. D., Lecturer on Anatomy and Demonstrator in the University of Pennsylvania, &c. With eighty Plates. 4to. Philadelphia, 1844. Pp. 235, and explanation of the eighty plates.**

THE Americans, with that ardour which characterizes all their proceedings, no sooner discover that a work of merit has appeared on this side the Atlantic, whether among ourselves or on the European continent, than they immediately reprint or translate it. They have consequently in the English language several works of merit which we still peruse in the originals; and the two works whose titles are given above are instances of the truth of this remark. The works of M. Moreau and of M. Chailly are highly valuable, as being essentially practical treatises, detailing the personal experience of their distinguished authors. That of M. Chailly possesses the additional advantage of embodying the opinions and extensive experience of M. Paul Dubois, the author being not only an admirer of that eminent obstetrical physician, but an old pupil, a former assistant, and now a colleague. Both

treatises agree in taking little notice of the opinions or writings of others, consequently all unprofitable discussions are avoided, and the purely practical details, as pursued by their respective authors, are more prominently brought out. The translators appear to have done full justice to the originals, and have, in both cases, reproduced the illustrative engravings with which both works are so richly adorned. Professor Bedford, the editor of M. Chailly's work, has besides added several valuable notes. The engravings render it perfectly impossible to misunderstand the author's meaning, and, while they cannot fail to prove of the highest benefit to the student, are by no means void of interest or of utility to the general practitioner. The illustrations which seem to us to possess most value are those which exhibit the different positions of the fœtus in utero, when manual or instrumental interference is required, and which represent the most approved modes of operating, and the various stages of the several operations. These illustrations are of very different values as works of art. Those of M. Chailly's treatise are simple unshaded outlines in wood interspersed with the text. Those of M. Moreau are beautiful lithographic engravings, which speak very favourably of the state of the art in America.

The subject of midwifery is treated very much after the same manner in the two works before us. M. Moreau's is divided into three great divisions. *First*, of the Organs concerned in Parturition. *Second*, of the Functions of Reproduction. *Third*, of the Expulsion of the Product of Conception. M. Chailly's, on the other hand, is divided into four heads. *First*, of the Organs concerned in Parturition. *Second*, of Conception and Pregnancy, true and false, and the Diseases Incident to that State. *Third*, of the Expulsion of the Product of Conception. *Fourth*, of the Accidents following Delivery. The two works, therefore, differ in one important point. That of M. Moreau leaves the woman the moment she is delivered, and takes no notice of those maladies which are apt to supervene on the puerperal state, or attack the child shortly after birth. That of M. Chailly, on the other hand, with greater propriety, describes the various maladies to which the newly delivered woman is liable, as puerperal fever, *phlegmasia dolens*, &c., and the treatment which is most appropriate for these states; and also notices shortly those affections to which the newly-born infant is liable, and the most approved modes of relieving them. On this account the treatise of M. Chailly is the most complete, seeing that a work on midwifery ought to include the consideration of all those maladies which are a consequence of the parturient state, and which the obstetrical physician is more especially called to treat.

Both treatises commence with a minute description of the organs concerned in parturition, more especially of the pelvis and

its various deformities. The work of M. Moreau is particularly full on this latter point, and is illustrated by a most extensive series of beautiful lithographic engravings. In M. Chailly's treatise this most important subject is only cursorily touched on under the head of "Diseases incident to Pregnancy," and wants all that precision and necessary detail which characterizes the work of M. Moreau. Both authors state on their personal experience that, even in the human female, relaxation and softening of the ligaments of the *symphysis pubis* occur. They regard it as "the accomplishment of a general law which governs all beings," by virtue of which the narrow pelves of the lower animals relax so as to permit the passage of a foetus much larger than its natural dimensions, but which, in consequence of the erect posture of the human species, never naturally takes place to such an extent as materially to increase the dimensions of the pelvis. M. Moreau relates many cases in which this relaxation occurred to such an extent that the pelvic bones moved freely over one another, rendering walking almost impossible.

In M. Chailly's treatise, in detailing the symptoms of pregnancy during the different months, much important information is given on the changes effected by pregnancy on the os and neck of the uterus, and on the difference which exists on these parts, in the *primipara*, and in her who has borne children. The descriptive parts are much aided by numerous outline engravings, representing the patency of the os and shortening of the neck as pregnancy advances.

It is quite unnecessary to notice all the topics discussed. We shall content ourselves with alluding to a few of those only which present more particular interest.

M. Moreau, in noticing the menstrual secretion, defends the antiquated notion of its being blood,—“pure blood, which distils guttatum;” and he agrees with Haller that “the menstrual blood of a healthy and cleanly woman does not differ at all from that drawn from a vein of this or any other woman, except that it may be slightly more viscid.” He consequently rejects the opinion of its being a secretion, and, to bear out his views, endeavours to show that the uterine vessels partake of the nature of the erectile tissue. When congestion takes place from the monthly “plethora” of the system, “the blood not being retained in the internal surface of the uterus by a fibrous membrane, as in the *corpora cavernosa*, it transudes both by the exhalant orifices of the arteries, and the patulous mouths of the venous sinuses.” It seems quite unnecessary to waste time and space in refuting this antiquated notion. It has been hundreds of times shown that the menstrual fluid possesses none of the properties of blood, but is a true coloured secretion; it does not coagulate, and whenever it does, it is not the proper menstrual secretion; and the re-

cent researches of Bischoff, Gendrin, Lee, Negrier, Raciborski, &c., have satisfactorily proved that the catamenial secretion attends, and is dependent on the periodic development of ova in the ovaries.

The subject of eclampsia, or convulsions during the puerperal state, occupies a prominent place in both works. Dr Lever and some other late writers have endeavoured to show that this dangerous complication is particularly apt to occur in those who present albuminous urine. From all the recorded cases, however, it does not appear that this albuminous state of the urine depends on organic disease of the kidney, seeing that the albumen disappears from that secretion very rapidly after delivery. It seems to be simply a functional affection, depending on the obstructed state of the abdominal circulation, produced by the pressure of the gravid uterus. If many, indeed most writers on midwifery, omit notice of the connection of convulsions with albuminous urine, they all state that one of the main predisposing causes is infiltration,—a disease depending on the very same causes as the albuminous urine itself; nay, more, infiltration is scarcely ever known to occur without the urine being more or less albuminous. M. Chailly states that the predisposing cause is “particularly infiltration,” and also says, “In all the cases of eclampsia which I have seen, the women were more or less dropsical.” M. Moreau does not speak so strongly as to the invariable presence of dropsy, simply stating that in many women “convulsions were always preceded by infiltration of the limbs.” He thinks the essential cause to be “a peculiar state of the brain.” Knowing that the urinary secretion is in a morbid state we can easily account for the occurrence both of serous infiltration and of convulsions. In almost every case where albumen is found in the urine there is a tendency to affection of the brain, either stupor or convulsions; and indeed it is in this way that such urinary diseases generally prove fatal. Knowing this fact, the treatment to be pursued requires this to be kept in view; and, accordingly, we find that M. Chailly, from viewing infiltration as the most common predisposing cause, urges the necessity of adopting a preventative treatment, consisting of blood-letting, purgatives, diuretics, &c., by which means he says the tendency to convulsions may be overcome. M. Moreau makes no mention of any preventative treatment, confining himself to the treatment of convulsions during labour. All seem to be agreed that blood-letting is the remedy chiefly to be depended on when a convulsive attack comes on during labour, followed up by free action on the bowels, and as speedy delivery as the circumstances of the case will allow.

Another dangerous complication of pregnancy is the hæmorrhage which results from the adhesion of the placenta over the *os uteri*. Almost every accoucheur has a different mode of treating

those cases, but the great mortality attests that there is still much room for improvement. To instance no others than the writers before us, M. Moreau recommends the use of the plug, and leaving the case to nature till the hæmorrhage is manifestly endangering the life of the woman, and then he instantly delivers by turning. M. Chailly, in cases of severe hæmorrhage from this cause, tries first rupture of the membranes and a firm plug in the vagina, and, if this does not arrest it, proceeds to deliver instantly by turning the child, previously incising the *os uteri* to facilitate its dilatation, as recommended by Dubois. If we examine the published cases in which the placenta adhered over the *os uteri*, we find that about the half of the children were still-born, and that from a fifth to a third of the mothers died of the effects of the hæmorrhage.* We also find that, as a general rule, the hæmorrhage was arrested the moment the placenta became detached, even though the child might not be delivered for many hours, or even for several days. Now, if we might be permitted to draw one practical conclusion from these facts, we would say that in every case of *placenta previa*, provided the hæmorrhage threaten the life of the mother, the placenta ought to be detached and brought down, and the child, if alive, delivered as speedily thereafter as possible. If the child be dead, and the hæmorrhage thereafter be not such as further to endanger the mother's life, it may be left alone till expelled by the natural efforts, seeing that all manual or instrumental aids greatly increase the danger to the mother. This plan we consider, as a general rule, preferable to that commonly recommended, because if we introduce the hand either through the placenta or by the side of it, in order to turn the child, we encourage the hæmorrhage, and it may even prove fatal both to mother and child before the operation of turning can be completed. This we find to have been the case with many of the recorded cases where this practice has been adopted—indeed, two of the fatal cases recorded by Collins in his Treatise on Midwifery were those in which the children were turned previous to delivery of the placenta. Dr Robert Lee turns in every case: yet of 35 cases which he relates 7 died soon after delivery from the effects of the hæmorrhage, and 6 at a more remote period from inflammatory affections, possibly induced by the efforts at turning. By adopting the plan of treatment which we recommend, the life of the mother at least is insured, in so far at least as danger from hæmorrhage is concerned; and the life of the child may be saved provided it be speedily delivered after the placenta. In one case which we attended about six years ago, this practice was adopted with the happiest results. The hæmorrhage was so great, and the placenta so much implanted over the *os*

* Of 174 cases of placental presentation collected by Dr Churchill, 48 proved fatal, or about 1 in 3.

uteri, that the mother's life could alone be saved by the most speedy arrestment of the flow of blood. The placenta was therefore detached and brought away, and as the child followed almost immediately, certainly within ten minutes, little difficulty was experienced in causing it speedily to manifest active signs of life. The above practice we only recommend in those cases where the hæmorrhage is so great as manifestly to endanger the life of the mother. In the more ordinary cases, where there is only moderate hæmorrhage from a portion of the placenta being situated on or near the neck of the uterus, rupturing the membranes, or the employment of a plug till the *os uteri* be fully dilated, and then the administration of ergot to hasten the process of delivery, in general suffices to bring the cases safely through both for mother and child.

The portions of M. Moreau's and M. Chailly's treatises which are devoted to the consideration of the mechanism of delivery, the different positions of the fœtus, &c., contain everything which can be desired, and as each successive stage of the different positions is represented from the moment when the face, occiput, breach, &c. is engaged in the upper strait till its passage through the vulva, the whole is rendered as intelligible as it is possible for the subject to be. Considerable stress is laid on the fact now well ascertained, that in most cases of presentation of the occiput, no matter what may have been its relations to any point in the upper strait of the pelvis, it turns during the mechanism of delivery under the arch of the pubes, and is delivered as if it had occupied originally the first or second position.

Perhaps the most important part of M. Chailly's treatise is that which treats of the different manual and instrumental aids which are occasionally required to assist delivery, whether this results from inertia of the uterine contraction, deformed pelvis, hæmorrhage, convulsions, mal-position of the fœtus, or other causes. Some idea may be formed of the minuteness of detail with which these are described, when it is considered that upwards of two hundred pages are devoted to them, and about one hundred outline illustrative engravings. The fault of the author, in fact, seems to be an excessive partiality for the employment of instruments. This is manifested even in his introductory paragraph "on the attentions required by the woman during labour." In it he states that the accoucheur, when called to attend a woman in labour, "should always supply himself with the forceps," and several other instruments which he names; and accordingly we find that he counsels the employment of instruments in cases which Blundell and most of our British practitioners would leave to nature. His learned editor, Professor Bedford, remarks in a note, that all the instruments an accoucheur requires to carry are a lancet and female catheter, seeing that the very circumstance of

having instruments always at hand is only an inducement to use them unnecessarily.

The directions for the application of the forceps, both by M. Moreau and M. Chailly, are extremely judicious. After showing that that instrument may be required from many causes, as inertia of the uterus, hæmorrhage, convulsions, impaction of the head, &c., they, but especially M. Chailly, enter somewhat more into details as to its application in cases of deformed pelvis. Both agree that three and a half inches is the smallest diameter which will permit of the birth of a living child, though if the child be small, it may even in some instances be delivered naturally when the diameter is only three inches and a quarter. In women the diameter of whose pelves measures less than three and a half inches, M. Moreau strongly urges the necessity of subjecting them to what he terms the debilitating regimen; and he relates a very instructive case in which, by following this plan, the child was so small at term as to be delivered naturally and alive, though the diameter was only three and a quarter inches. She had previously been delivered by instruments of a dead child, and subsequently fell a victim to neglecting the employment of the debilitating regimen on her next pregnancy. The advantages of this regimen we have seen in two remarkable instances which fell under our care. It had the effect in both cases of so preventing the growth of the child, that they were fully as small at term as if they had only been at the seventh month. We are aware that Dubois and many others do not believe that dietetic means can have any effect on the growth of the *fœtus in utero*; and they chiefly found their opposition to the facts stated by Baudelocque, Merriman, and Moreau, on the circumstance, that women labouring under phthisis or debilitated by antiphlogistic regimen, in consequence of inflammatory attacks, are delivered of as large children as other women. This is no argument at all against facts. Besides, the woman debilitated by antiphlogistic regimen in consequence of inflammatory attacks, is only temporarily subjected to that severe regimen necessary to prevent the full growth of the fœtus; and it is a known fact, that phthisis, even in its last stages, is temporarily arrested by the occurrence of pregnancy, and that the appetite is often perfectly voracious.

Moreau and Chailly both admit that when the contraction of the diameter of the pelvis is three inches or less, premature delivery ought always to be adopted. M. Chailly prefers adopting this practice to any attempt at preventing the fœtus attaining its full size, even when the pelvis is over three inches in diameter, and from having ascertained that the biparietal diameter of the fœtal head at seven months one week, the earliest period at which it can be deemed viable, is from two and a quarter inches to two inches nine lines, he regards this latter diameter as the minimum

at which premature labour ought ever to be attempted to be induced. M. Moreau thinks that "the only case which would justify the artificial excitement of labour, would be that of a pregnancy of seven months, with a pelvis having a diameter of at least two and a half inches, or at most three inches." This is in a case where we wish to save both mother and child. If, however, from peculiar circumstances, as excessive malformation, no living child could ever be delivered, means ought to be employed to induce premature delivery as soon as possible after conception, rather than wait till the period of pregnancy be completed, and run the risk of a Cæsarean section.

M. Moreau gives no details as to the mode in which premature labour ought to be induced, but M. Chailly gives minute directions as to the mode which M. Dubois and he employs. He, by the aid of the speculum, introduces a cone of prepared compressed sponge within the *os uteri*. It is well lubricated, retained externally by a string, and carried to the orifice by means of the tampon forceps. A soft sponge moistened with tepid water fills the upper portion of the vagina, and the speculum is withdrawn. Small doses of ergot are then given, and, in general, uterine contractions begin in from one to two hours thereafter. When the intensity of the pains seem to indicate that the dilatation of the orifice is proceeding, the sponges are withdrawn, and if the membranes project they are punctured with a writing pen, when real labour speedily follows. In a few cases it is necessary to reintroduce a larger cone of compressed sponge, and give more ergot; but it is dangerous to give too much of this medicine, as it may prove fatal to the foetus. M. Chailly disapproves of exciting premature labour by manipulations and immediate puncturing of the membranes, but he takes no notice of the plan said to have been pursued by the late Professor Hamilton of Edinburgh, viz. separation of the membranes round the neck of the uterus, so far as the finger could reach. Dr Lee and other London practitioners almost invariably prefer puncturing the membranes.

In treating of the operation of cephalotomy, fortunately a rare one now, in consequence of the timely induction of premature labour, M. Chailly discards all instruments but two,—the perforating scissors of Smellie, and the cephalotribe of Baudelocque. He states he has never found it necessary to use any others, and most strongly enters his protest against the use of the sharp crotchets, as instruments nearly as dangerous to the mother as to the child. M. Moreau, on the other hand, probably from never having employed the cephalotribe, ridicules it as a useless instrument, whose very bulk is likely to prevent its application in those cases which require such assistance. He therefore prefers the perforator of Mauriceau, or Smellie's scissors, a scoop to extract the

brain, and then, as need requires, the forceps or crotchet to deliver the child. The objections which one obstetrician holds relative to the favourite instruments of another are for the most part theoretical, and seem to arise from the fact of his having become so dexterous in the use of those which he is habituated to employ that he considers them as incapable of improvement, and that any other instrument is a useless invention. The cephalotribe of Baudelocque cannot be that useless instrument which Moreau would have us believe it is, seeing that Dubois and Chailly find it "advantageously supersedes all the sharp crotchets, and the entire arsenal of cutting instruments armed with teeth, &c." In using this instrument M. Chailly does not even find it necessary to puncture the cranium and evacuate the brain, seeing that the closing of the blades of the instrument ruptures the scalp and allows the free escape of the pulpaceous brain.

As to the operation of symphysotomy, both M. Moreau and M. Chailly state very fairly the objections to such an operation, and demonstrate that, while it scarcely increases the chances of the child being born alive, it most materially increases the dangers to the mother, seeing that if it do not speedily prove fatal, it generally leaves her lame for life. M. Chailly has therefore no difficulty in deciding whether to prefer symphysotomy or cephalotomy where the diameters of the pelvis are too small to permit of the birth of a living child, and premature labour has been neglected in time. Of 41 women in whom symphysotomy had been practised, 14 died, and the rest were left more or less lame for life. Of the children 13 only survived. But we know, from the history of these recorded cases, that the operation was several times unnecessarily performed, seeing that in many of the cases the women, both previously and in their subsequent pregnancies, bore living children; and it was chiefly in these cases where living children were born. The operation has never received the sanction of the profession in this country, seeing that all acknowledge that the life of the mother is of infinitely greater value than that of the unborn child, whose chances of life may, after all, not be increased by the dangerous operation on its mother.

Much discrepancy of opinion exists as to the necessity for performing the Cæsarean section. M. Chailly thinks that, as practitioners become more habituated to the use of the cephalotribe, this operation will be talked of as a thing that has been. He alone consents to its performance when the greatest diameter of the pelvis is under two inches, when, in fact, there is no room to extract the child piece-meal. M. Moreau allows the Cæsarean section in two cases only; 1st, where the mother dies in the later months of pregnancy, and there is reason to suppose the child survives; and 2d, where the passages are so contracted that extrac-

tion of the child piece-meal would be attended with greater risk than the Cæsarean section itself. The Americans are proverbially fond of operating, and accordingly we find that Professor Bedford, the editor of Chailly, not only looks with a much more favourable eye on this operation than either the French or British accoucheurs, but would even seem to give it the preference to cephalotomy in most cases. Dr Churchill has most satisfactorily answered the question as to the comparative mortality to the mother or the two operations, by collecting the statistics of these several operations. Of 252 cases in which cephalotomy was performed, 50 mothers died, or only 1 in 5; but of 321 cases in which the Cæsarean section was performed, no fewer than 172 mothers died, or considerably more than a half. This puts the operation in its true light as one of the most formidable and fatal in surgery; consequently one which should never be undertaken without the most urgent necessity, and after the most mature deliberation.

Such are a few of the interesting points touched on in these works. Both are works of great merit, but that of M. Chailly is, on the whole, the one best adapted for the instruction of the student, and for renewing the knowledge of the medical practitioner when he happens to meet with a case of difficulty. It is in fact a work which we should like well to see in a British dress, and which deserves a place in the library of every practitioner of midwifery.

ART. II.—1. *Distinction without Separation. A Letter to the President of the College of Surgeons on the Present State of the profession.* By JOSEPH HENRY GREEN, F.R.S., F.G.S., Professor of Anatomy to the Royal Academy, Professor of Surgery at King's College, London, one of the Surgeons at St Thomas's Hospital. London, 1831. 8vo, pp. 47.

2. *Separation without Dissension. Observations addressed to General Practitioners, on the best means of maintaining their Privileges and Respectability.* By WILLIAM COOKE, Member of the Royal College of Surgeons, &c. London, 1831. 8vo, pp. 89.

3. *Thoughts on Medical Reform.* By a Retired Practitioner, (the late JOHN ALLEN, Esq., late Master of Dulwich College.) London, 1833. 8vo, pp. 33.

4. *Observations on the Present System of Medical Education, with a View to Medical Reform.* By a Licentiate of the Royal College of Physicians of London. London, 1834. Pp. 95.

5. *Vindiciæ Medicæ, or a Defence of the College of Physicians.* By Sir G. L. TUTHILL, M. D., &c. London, 1834. Pp. 113.
6. *A Sketch of the Medical Monopolies, with a Plan of Reform. Addressed to the Right Hon. Lord John Russell, His Majesty's Secretary of State for the Home Department.* By JAMES KENNEDY, M. R. C. S. L. London, 1836. Pp. 95.
7. *A Letter to the Right Hon. Viscount Melbourne, with the Outlines of a Bill for regulating the practice of Surgeon-Apothecaries, and Chemists and Druggists, throughout the United Kingdom of Great Britain and Ireland, and a plan for suppressing uneducated Practitioners in a summary manner before a Magistrate or Justice of the Peace.* By MARTIN SINCLAIR, M. D., Member of the Royal College of Surgeons in London and Edinburgh, &c. Manchester, London, 1840. 8vo, pp. 36.
8. *On Scientific Medicine, and its relations to and claims upon Society at Large. An Address read before the North of England Medical Association, held at Carlisle on Tuesday, 15th September 1840.* By WILLIAM ELLIOT, M. D. London, 1840. 8vo, pp. 44.
9. *An Investigation of the Proposed Scheme of Medical Reform, in reference to Chemists and Druggists. Comprising an Analysis of Mr Hawes's late Medical Profession Bill ; a Review of the Pharmaceutical Society ; and a Defence of the Druggists' " Counter Practice." Addressed to Benjamin Hawes, Esq., M. P., and the Chemists and Druggists of the United Kingdom.* By G. CROOK, M. P. S. London, 1841. 8vo, pp. 32.
10. *The Touchstone of Medical Reform ; in three Letters addressed to Sir Robert Harry Inglis, Bart. M. P.* By JOSEPH HENRY GREEN, F. R. S., Professor of Anatomy to the Royal Academy, one of the Surgeons to St Thomas's Hospital, &c. London, 1841. 8vo, pp. 72.
11. *Plan of Medical Reform and Reorganization of the Profession without subverting the existing Colleges of Physic and Surgery, addressed to the Right Hon. Sir R. Peel, Bart.* By RICHARD CARMICHAEL, M. R. I. A., President of the Medical Association of Ireland, &c., and Consulting Surgeon of the Richmond, Hardwicke, and Whitworth Hospitals. Dublin, 1841. 8vo, pp. 55.

12. *Remarks on Medical Reform, in a Letter addressed to the Right Hon. Sir James Graham, Bart., one of Her Majesty's Principal Secretaries of State, &c.* By SIR JAMES CLARK, Bart., M. D., F. R. S., Physician in Ordinary to the Queen and Prince Albert. London, 1842. 8vo, pp. 30.
13. *Remarks on Medical Reform ; in a second Letter addressed to the Right Hon. Sir James Graham, Bart., one of Her Majesty's Principal Secretaries of State, &c.* By SIR JAMES CLARK, Bart. M. D., F. R. S., Physician in Ordinary to the Queen and Prince Albert. London, 1843. 8vo, pp. 40.
14. *On the Danger, Irrationality, and Evils of Medical Quackery.* By CHARLES COWAN, M. D., E. et P., Physician to the Reading Dispensary. London, 1839. Pp. 43. 8vo.
15. *Quacks and Quackery Unmasked, or Strictures upon the Medical Art, as now practised by Physicians, Surgeons, and Apothecaries. With Regulations as to its Reform, &c.* By J. E. FELDMAN, M. D., &c. London, 1842. 8vo, pp. 112.
16. *A Bill for the better Regulation of Medical Practice throughout the United Kingdom.*
17. *Introductory Address to the Students of University College, at the opening of the Winter Session in the Faculty of Medicine, 1844, 1845.* By SAMUEL COOPER, Professor of Surgery in the same College, &c. London, 1844. 8vo, pp. 34.

WHEN in our last Number we directed attention to the Bill brought into Parliament by Sir James Graham on the 7th of August, we adverted to the opposition which seemed to be then rising in the profession against several of its provisions, and we took occasion to express the opinion, that it was something rash and precipitate, and that the terms in which the proposed measure had been examined were hasty and injudicious.

So far as correct observation and as calm and dispassionate judgment have enabled us to consider this matter, we have had, we are sorry to say, little occasion to modify this opinion. Since that time meetings of the members of the medical profession have been held in about fifty different places, sometimes, as in London, in different districts of the same city, and, with a few honourable exceptions, the speakers at these meetings and the movers of the resolutions have been chiefly desirous to express an indiscriminate and unqualified hostility against all the provisions and arrangements of the proposed Bill. In most of the meetings held within the first two months after the Bill had been brought forward, the

terms in which the measure was described were harsh, uncivil, violent, and uncompromising. The bill was represented as a means of degrading and destroying the profession ; sometimes as a bill for promoting the growth of quackery ; in almost all cases it was condemned in the most bitter and unbecoming language.

As time advanced, and perhaps as the heated passions of these gentlemen began to cool, as their violence found vent by the safety valve of resolutions published in local and metropolitan newspapers, meetings were held at which the speakers expressed their thoughts and opinions in much more temperate and sober language. All the violent effervescence and ebullition of medical wrath had escaped at first. And afterwards, though some transient heat continued to smoulder in different places, it was of a much less vehement and noisy character. Within the last four weeks, especially, those who have been observing the course and effects of this movement, must have remarked that, at most of the meetings, the language of violent denunciation and angry hostility has been abandoned ; the bill is either not censured or it is commended generally ; and if objectionable points are recognised, it is recommended that these be made the subject of consideration and remonstrance ; and all harsh and precipitate condemnation is either openly deprecated, tacitly discouraged, or decidedly opposed.

When calm and dispassionate observers begin to consider the cause of this agitation and its unequal character, for all men will inquire into the causes of such phenomena, it proves by no means very easy to obtain a satisfactory solution of the difficulty. If the general testimony of the majority of the profession were to be trusted, it was assuredly manifest that there was a general wish for reform ; and if all statements were correct and credible, it is not less certain, that reform was very much required. Yet here comes the proposition to accomplish what has been desired, what has been thought necessary ; and behold, it is opposed, censured, and condemned as no other legislative measure perhaps, except the Poor Law and the Education Bill, has ever been opposed and censured. Singular persons these doctors are, exclaim the bystanders. Here they are offered what they have been soliciting ; and a very considerable number of them are in extremely bad humour and employ all sorts of uncivil language against the proposer of the measure. What, then, is the cause, or what may be the causes of the tumult ? One of the first and most obvious is this, that the medical profession consists of different parties, the interests of which these parties believe to be different from each other ; and while one party wished for reform, another party either did not wish for it, or they did not wish for the sort of reform which is now proposed to be made.

Among those who desired reform in the medical profession, not a few entertained this wish, because they saw that it was necessary, both to the respectability and utility of the profession, and also to the good of the public. They were more or less aware of the state of matters which was described in our last article; they saw and felt its effects; and, as they were satisfied that such a state of affairs was compatible neither with the welfare and respectability of the profession, nor with the advantage of the public, they accordingly wished that state of things if possible amended and rectified. These belong to the class of rational and moderate reformers.

Among those, however, who were desirous for reform, were many who had not formed very correct or distinct ideas, either on that subject or on the circumstances by which it was rendered necessary. Something they saw was wrong; but what that something was, and wherein the evil consisted, they either did not understand, or were not by any means agreed. Sometimes they saw patients leave them without any sufficient reason appearing, or without any reason at all being assigned. Sometimes they saw persons obtain their professional services, and not only refuse to remunerate their services, but act as if they considered the favour conferred on the practitioner who was so employed and treated. In some instances, men of considerable standing and fair experience were treated either with coldness and inattention, or with positive contempt and indignity in the disposal of public offices, while juniors, either grossly ignorant, or with pretensions unsupported by real attainments, were preferred without good reason. In other instances, the members of public boards, instead of acting towards the profession with the deference and respect and justice which might have been expected by the members of a profession which have been ever ready to devote most freely to the public their energies, labour, time, and experience, have acted with a degree of rudeness, overbearance, and injustice, which could not have been looked for in a community, regulated, or supposed to be regulated, by the principles of Christianity.

No doubt could be entertained, that, for such complaints, there were sufficient grounds. The facts were established by daily experience, by the conduct of the managers of workhouses, hospitals, parochial infirmaries, and public charities and institutions in general, the guardians of poor law unions, and, above all, by the commissioners appointed under the New Poor Law. It is not long since the guardians of the St Mary-le-Bonne Infirmary passed a resolution, depriving their medical officers of the salary which used to be paid for their professional services. Numerous instances also took place, in which the guardians of poor law unions advertised for and engaged medical attendants on the principle of

tender, and the lowest rates without regard to the question whether it was possible for any human being, much less a well-educated medical man, to devote his physical and mental powers to the undertaking; and, in not few cases, when respectable practitioners declined, on such unreasonable terms, to undertake the duty, young practitioners were induced to come from a distance and perform the functions of a liberal profession, for a rate of remuneration much lower than that of a light porter or errand-man in London, Manchester, Liverpool, or Edinburgh. So prevalent was this system, that the Provincial Medical Association thought it deserving their attention and investigation; and, accordingly, a committee, appointed by that body, drew up a report on the subject, and addressed it, with a remonstrance, to the Secretary of State for the Home Department. This served to demonstrate the existence and the prevalence of the evil, but not to abate or remove the nuisance; and we understand that its reign continues.

That these were the facts of the case it was impossible to deny. But whether they were such that they could be removed by legislation, is a very different question. It may be doubted, indeed, whether to any one of the evils and grievances now referred to any direct remedy could be applied. They had sprung up in the natural course of things, from the wild and irregularly cultivated soil, as evil weeds in a neglected and badly cultivated field; and they could scarcely be expected to die out, as it is said some noxious plants pine and die before the genial effects of industrious culture, until a more wholesome and systematic method of training and management were adopted. Many of the evils had owed their origin to the members of the medical profession themselves, who, in their headlong desire to promote their own interests, often disregarded that of their neighbour; and forgot that, when one man acts in an unfair, unjust, or unprofessional manner to another, whatever immediate advantage he may thereby acquire, he can never be certain that another person may not act in the same manner to himself; and he, consequently, cannot justly complain if any one does so. It is not upon the vulgar and rather coarse idea, often promulgated, that the members of the medical profession ought to make common cause of the interests of all, that this course is to be condemned, but on the more comprehensive one, that they ought to act to every other member of the profession, as they would wish others should do to them. Common cause they ought assuredly to make; but the effects ought to depend on a more elevated, a more just, and a more righteous principle than that of merely leaguering themselves in union.

Such, however, are the keenness and the activity of competition in a profession perhaps in some senses over-stocked, that in the

eagerness to secure employment, and especially lucrative employment, not only are the dictates of prudence and the rules of decency, or at least decorum disregarded, but the most simple and obvious principles of justice and fair-dealing are overlooked, and every consideration is lost in the engrossing one of procuring patients, and, next to this, of preventing these from applying to rivals. In this singular contest various arts are employed. One of the most common is to have sympathizing and promoting friends who give hints of the superior skill, attention, and success of the favoured competitor. Another method is for the candidate to enlist himself under the banners of a particular religious denomination, most usually of what is, with little of the spirit of genuine Christianity, called Evangelical. But as neither of these methods are in all cases applicable, the argument which is found most generally intelligible is the *argumentum ad crumenam*, moderate charges, by which is invariably meant, that the visits are rated at a low figure, while their number is commonly made to compensate for the apparent reduction.

Does the picture seem harsh in lineament, and disagreeable and humiliating in colouring? It is most strictly correct, and will derive irresistible confirmation from the experience of every dispassionate observer. It is, in one word, part of that mighty evil of converting into a miserable trade of making pounds, shillings, and pence, by all and every means, a profession which ought to be liberal,—a profession which, because its exercise depends on the cultivation of the intellectual faculties, the exertion of judgment, and the application of knowledge, has been denominated learned, and has, therefore, been invariably held in honour. Such has it been, and such will it ever be, where medical practitioners are forgetful of the high vocation wherewith they are called, and lower themselves to the rank of mere traders and commercial dealers.

We have, further, however, good reason to believe that a proportion of the profession not inconsiderable did not at all desire reform. They were perfectly satisfied with the present order of things; they saw nothing wrong or requiring amendment, excepting what they themselves could amend; they saw no occasion for any change, and consistently enough wished for none. To attempt to define or distinguish this section of the profession by more specific characters is quite unnecessary. Sufficient is it to say, that no intelligent observer can doubt their existence, or the operation of their principles. Neither is it requisite to attempt to explain the origin of the sentiments now referred to, further than by saying, that they were the offspring of little information, or rather of a considerable amount of ignorance, with a large proportion of gross selfishness. The minds of this section of the profession were either not properly enlightened, or they were like all imper-

fectly informed persons, the dupes and victims of misrepresentation. From being partially ignorant of the actual and true state of matters, they had never thought of inquiring or seeking for information ; and in this happy state of indifference it was not natural to suppose that they saw any necessity for improvement.

It is chiefly among the two latter sections of the profession that the opposition to the New Medical Bill has arisen ; and this we regard as the true explanation of the apparent anomaly, that what was and is still ardently wished for by many, is, when offered and placed within reach, either censured with harsh and unbecoming haste and temerity, or openly and absolutely condemned and rejected. Those who were convinced of the necessity of reform are still convinced of the same necessity, and still wish it, and approve of the bill as a means of its accomplishment. Those who wished for reform, but who did not form clear or correct opinions on the means by which it was to be accomplished, or who formed erroneous notions on the nature and objects of reform, were disappointed and displeased ; and those who saw no cause for reform, were equally dissatisfied.

Let us, nevertheless, avoid doing the profession injustice in this matter. Though certain sections of them were disposed of themselves to censure and oppose any measure of reform, which did not embrace all their own views, and propose to accomplish all the objects which they wished to see accomplished, yet they would not have gone such extraordinary lengths in demonstrating their own selfishness, and proclaiming their ignorance of the true merits of the question, had they not been led by various extraneous authorities, to believe that the bill would be detrimental to their interests. Many members of the profession were unable to form an opinion, partly from want of information, partly from not understanding the nature of the evils complained of, or the best mode of removing them. Others, as has been already said, entertained erroneous notions of the matter. These and many more were the ready and apt listeners to whoever should raise the cry, that the craft is in danger. There are always, in a country like this, numbers ready to raise this cry upon any change being proposed. They have heard of the old doctrine, that all changes are bad, because all changes are revolutionary ; and it appears most commonly to depend, not on the reasonableness or the necessity of the changes, but on some other extraneous and accidental circumstances, often exceedingly trifling, whether this alarm shall be raised or not. In the present case the alarm was raised, not in consequence of the intrinsic merits or demerits of the bill ; but from causes manifestly of a different nature altogether ; and it was followed and accompanied by a considerable amount of agitation and opposition. A great deal of this agitation and opposition has been created and maintained by parties and persons,

who, to say the least of it, are not well informed on the question at issue, are guided in their judgments neither by knowledge, experience, nor reason, but by their passions and prejudices, and by what they conceive to be their interests, or the interests of those whose cause they advocate, and who, neither by previous habits nor by acquaintance with the profession, were capable of forming sound opinions.

Among the public journals which have been active in this way, the *Times* stands pre-eminent; and by the observations called editorial, this paper has shown that he takes a considerable interest in the progress of this medical warfare.

Now the *Times* is, it must be admitted, for many purposes, and in several senses, a potent,—a magnificent engine; and sometimes he is judiciously and effectively worked. Thus, when a band of gentlemen swindlers combine for the purpose of plundering a bank, the *Times* rises with just indignation, and with undaunted perseverance, drags to justice and deserved punishment the offenders, however exalted, and however ingenious. Then when a friendless pauper is badly used in a Union Workhouse, who is so eloquent, so severe, so awful as the editor of the *Times*? Who can castigate the three commissioners with such energy and effect as the editor? In the case of the hard-wrought and ill-paid sewing and embroidery girls, who so bold, who so pathetic, who so just as the editor? In the Church, we are at a loss what to think of the zealous journalist. At one time, though by no means a Romanist, or a believer in the real presence, he seems to come forth in favour of the Tractarians. At another time, though a sincere Church of England man, he deals hard and heavy blows on the Rubricists, and all those indiscrete admirers of ritual observances, who have of late exerted their powers to the utmost to undermine, if not to pull down the holy fabric. In a word, the editor of the *Times* is in many things a very perfect, gentle, knight, strong and valorous, noble and chivalrous; and often, like these knights, he draws the sword in defence of the oppressed, in maintenance of the right, and to put down tyranny and injustice. But oftentimes, alas, we have to observe that the same worthy gentleman acts the part of d'Alembert's blind cudgel-player, who, when called upon to beat off the foe, deals his blows indiscriminately, doing as much harm as good, and manifestly from the same cause; because, the eyes of his mind not being opened, he knows not which is the right and which the wrong party, which the aggrieved and which the aggressor.

That this has been altogether the case in the recent history of the *Times* and newly-proposed medical bill, numerous circumstances concur to show, and it is quite unnecessary to attempt formally to prove. The editor of the *Times*, or whoever he has employed, has gone into this subject with such utter disregard of the

facts of the question, and has so little knowledge of the nature and objects of proper medical reform, and so much prejudice and lack of judgment, with indiscriminate hostility to the bill, that it is quite manifest that he is totally unfit to deal with the true merits of the questions involved in its consideration. His observations also betray other symptoms which show that he is a very unsafe adviser to those whom, on this occasion, he has taken under his especial protection. By bold and confident assertions, mixed with a large proportion of misrepresentation as to the alleged effects of the bill, and by appealing to the passions of the least educated portion of the medical profession ; finally, by pretending that it is part and offspring of the New Poor Law, he has contrived to make as admired a piece of confusion and disorder in the intellects of the general medical practitioners as can be found in any lunatic asylum in the three kingdoms. His conduct and that of most of his adherents would lead to the inference, that little or no knowledge of a complicated subject is a much better preparatory to enable any one to form an opinion than ample and careful consideration of it ; and that those who have long studied the subject, and are most acquainted with all its relations and bearings, are least qualified, or rather totally disqualified, to give any opinion on the matter. On the presumption and arrogance of such a mode of reasoning we forbear from making any remark. But there is no reason why we should not show the result which must inevitably proceed from persons presuming to form opinions, where they have not only an imperfect knowledge of the facts, but where they have not been accustomed to reason and think on the questions which arise.

Now, we maintain that if there were reasons for any bill being received by the parties most interested in its provisions with deference, and we must add gratitude, and for being subjected to a calm, patient, and attentive consideration, they belonged to the bill proposed by Sir James Graham. It was not either digested or brought forward in a hasty or precipitate manner. It had been under consideration by its author for at least two full years—we believe we might add a much longer time. He had received the advice and assistance of many persons who had considered the subject carefully and deliberately, and who were intimately acquainted with the wants and the condition of the medical profession. He had received and considered carefully the information furnished by all the public corporations and associations, not once but several times ; and certainly the individual thus informed and pains-taking was much better qualified to form a legislative measure upon just, equitable, comprehensive, and practical principles than any other person or body of men, be they who they may.

If any advantage, also, could accrue from the well-meant and sincere though abortive attempt by which the measure of Sir James

Graham was preceded, that manifestly pertained to the measure of the Right Honourable Secretary. He was in a position to derive advantage from the previous attempts of Mr Warburton and Mr Hawes; and we believe it is admitted by the most competent judges, that from these attempts he did derive very considerable advantage. In short, all who know anything of the history of this measure, and of the difficulties with which any one attempting medical legislation must have to contend, will at once admit that it was concerted after great and long-continued attention to the subject, with the utmost pains, with the most patient attention to the claims of differing, sometimes conflicting interests, and with most sincere anxiety to improve the condition, to extend the efficiency, and to fix the respectability of all the ranks of the medical profession. At the same time it could not be expected that the measure was to be faultless and perfect. That it would have been unreasonable to expect from any mere piece of human legislation.

But though it had been much more faulty and objectionable than its severest judges have represented it to be, it ought to have been received and examined in a more cordial and friendly spirit. It is infinitely more easy to censure than to legislate. In this case the test would have been to allow those who so liberally volunteered their judgment, to try what they could produce in the way of legislation. We have no doubt that had this simple method been adopted, and all those who erected themselves into judges, been first made to undergo the ordeal of being judged, if they did not learn a little diffidence and modesty, they must at least have been taught by experience how difficult it is to legislate, and above all, to legislate for the members of the medical profession.

The members of the profession also considering how very imperfect and inefficient in many instances their art is, and how much both it and its practitioners stand in need of indulgence and forbearance, might have been a little more temperate in their language, a little more candid in their views on the objects of the author of the measure; and it would certainly have tended to make the public think more highly, both of their wisdom and their disinterestedness, had they refrained from those angry denunciations, in which they so freely indulged, for the first two months after the publication of the contents of the measure. The apostolical exhortation, that every man should be swift to hear, slow to speak, slow to wrath, was indeed here completely reversed; for every man was more swift than his neighbour to speak, slow to hear, and all were prompt to wrath. Assuredly the doctoring tribe are wise in their generation.

In submitting the foregoing remarks, we have to add two reflections which occur on the locality of all the clamour and oppo-

sition that have been made against this measure. The first is, that all this opposition has been confined to England ; and has evidently been mostly among those called general practitioners. The second is, that scarcely one single meeting, so far as we know, has been held either in Scotland* or Ireland ; and that where the medical corporations have deliberated on the measure, they have not only approved of its general spirit, but they have recommended, in pretty unequivocal terms, that it should be passed, after suitable and necessary modifications in details, into a law.

It would be invidious and to some not very agreeable, to draw from the facts now stated specific conclusions. But we cannot refrain from suggesting to our brethern in the south, whether the circumstance of the violence of their opposition in the early part of their career, may not leave them in somewhat of a minority before the agitation is completed, or at all events, before the bill is read a second time.

Having made these preliminary remarks, we have now to consider the separate provisions of the measure in detail.

And in the first place we observe, that it was necessary to deal with all existing institutions with a reforming, that is, an amending and improving, not a destructive policy. The necessities of our ancestors, and the circumstances in which they were placed, rendered it necessary for them to create certain institutions and corporations, to which, in the exclusive spirit of these days, certain monopolies, privileges, and exclusive rights were granted. To the universities were conceded the exclusive power of teaching and of conferring degrees, and the different colleges of physicians and surgeons were endowed with the right and authority of regulating medical and surgical practice, and of ascertaining and judging of the qualifications of practitioners. Man is in his natural state a vindictive, as well as a protecting being. He never sees any thing of which he disapproves, and which he accordingly thinks wrong, without thinking of punishment ; and consistently, under the plea sometimes of retaliation, sometimes of preventing the repetition of the offence or wrong, sometimes of exerting authority, he assumes to himself the right of persecuting, molesting, and by all means of annoying the offending party. In all these rights, therefore, he has claimed and obtained the power of inflicting pains and penalties, or, in other words, punishment of various kinds upon all those who, by violating or infringing these artificial rules, had incurred his disapprobation, and aroused his evil and selfish passions. Such were the principles in which the College of Physicians in the reign of Henry the Eighth was founded ; and such were the principles on which, as we stated in our last, it long acted. When this body appeared to be spontaneously abandoning these principles, and certainly

* One or two have been held in Glasgow since the above was written.

had shown a disposition to cease acting on them ; another body arose all at once shortly after the commencement of the present century, and having acquired the power, began to exercise it with great industry. It must to all persons taking enlarged views of social and corporate establishments, and those rights with which they are usually endowed, appear a great anomaly that the Apothecaries' Company were allowed, in the nineteenth century, to assume and exercise powers and authorities which run every risk of being converted into an engine of persecution and oppression, worthy only of the sixteenth century. The powers and authorities to which we now refer, were given with the alleged purpose of preventing irregular or unqualified practitioners from exercising their vocation, in short, of suppressing quackery whenever it showed itself. The pretext was plausible ; the object was praiseworthy ; the purpose, we will admit, was deserving approbation. Here, however, we must pause in our commendations. Its judiciousness was most questionable ; its policy was ambiguous ; and in execution it was impracticable.

During the first two centuries of the reign of the College of Physicians they laboured most diligently, by prosecuting, fining, and imprisoning, to extinguish irregular and unlicensed practitioners, and to suppress the practice of quackery. It is now admitted that they were quite unsuccessful. They went so far as to direct the artillery of the law against the members of the college of surgeons ; and, after some time of this unseemly and ignoble warfare, the system of persecution lost much of its violence ; and, if it was not given up, at least was less frequently resorted to. The surgeons have since been allowed to prescribe medicine, and to treat internal diseases without let or hindrance, and we believe, not to the injury, but to the profit and advantage of the lieges. It is now pretty generally, if not universally admitted, that the powers with which the College of Physicians was invested did not prove adequate to the suppression of quackery and the extinction of the race of unlicensed practitioners.

It was natural to expect that the lesson taught by the example of the physicians was quite sufficient to convince any body guided by experience that quackery was not to be suppressed. Experience, it is said, teaches even fools. But the apophthegm might justly be modified, by saying, that they are wise who can be taught by experience ; and that it is only the incorrigibly unwise, upon whom experience can make no impression. Untaught, therefore, or disdaining to be instructed, the Apothecaries' Company adventured in 1815 what the College of Physicians had, very nearly a century before, given up in despair as an impracticable labour. The result was the same. They attempted, and in the attempt they failed, and failed shamefully. Neither could it be said,

magnis tamen exoidit ausis. Nearly thirty years have now rolled over their heads, considerably more than one quarter of a century ; and the race of quacks and unlicensed practitioners is not only not extinct, but it is as vigorous and thriving almost as ever. If this length of experience be insufficient to convince them of the impracticability of their schemes, it may be safely said that no argument of any kind will make them view the matter in its proper light.

To others, however, this experience speaks a language distinct, audible, and intelligible. It is on this account principally that it is one of the first objects of the bill to abolish all exclusive privileges which are connected with the power of inflicting pains and penalties on unlicensed and unqualified practitioners ; and accordingly, in the first clause, or preamble of the bill, the author of the measure proposes to annul and repeal all those parts of former bills which confer any right of this kind.

In so doing we are perfectly satisfied that the author of the measure acted a wise and a judicious part. Complaints against exclusive privileges and rights, especially those possessed by the medical corporations, had been loud, multiplied, and continued. Many wished to abolish these corporations entirely, and, had their power been equal to their inclination, they would have left neither College of Physicians, College of Surgeons, nor Apothecaries' Company in any part of the United Kingdom. This destructive course, however, would have been burdened with the double and heinous sin of wickedness and impolicy. Nor was a course so extreme at all necessary. The wise and the judicious course was to leave the corporations standing, to be useful as superintending authorities and qualifying boards, and to deprive them of all power of being hurtful. These corporations possessed and exercised two functions ;—the one that of ascertaining the qualifications of different members of the profession,—of conferring the license on the qualified and withholding it from the unqualified ;—the other that of discovering, prosecuting, and punishing, if they could, all interlopers, unlicensed practitioners, and quacks. The former authority is retained, modified, regulated, and confirmed ; the latter it is proposed altogether to withdraw and abolish.

This clause has been made the great pretext for all the complaints and outcry against this legislative measure. That it is a real cause we can scarcely bring ourselves to believe. It must be admitted, nevertheless, that many of the reclaimants seem, by the loudness of their tones, to be most earnest and sincere in their belief as to its injurious effects. It would not do exactly to distinguish the sincere from those who are not in earnest in this outcry. But, granting that all were perfectly sincere in opposing the bill on this ground, and in believing that the clause would

produce the results which they apprehend, that would not alter the state of the matter. It would merely show that the parties so believing were imperfectly informed on the subject, entertained erroneous and contracted views on medical legislation, were one century at least behind the age, and, consequently, were at once unfit to advise any one on this subject, and were to be listened to only as the antiquities or relics of a former age. They were indeed to be viewed with the same kind of feeling with which we contemplate a cross-bow or the wooden tallies of the exchequer.

In criticising and censuring,—examining, we cannot say,—this clause, all sorts of uncandid and disingenuous arts have been employed. The bill has been described as one which threw open the practice of the medical profession to all and sundry, learned and ignorant, qualified or unqualified. It has been described as a bill for the encouragement and protection of quackery. Lastly, it has been represented to be a bill to degrade and dishonour, and even to rob and plunder the medical profession. We cannot bring ourselves to believe that the persons so expressing themselves believed what they said. If they did, they were guilty of the most stupid calumny that ever issued from the human mind. They knew quite well that, whatever the preamble said, by other clauses of the bill it was required that all orders of the medical profession should possess a much higher degree of attainments, and a much more comprehensive education than they had hitherto received. They knew also full well that, though the corporations, and especially the Apothecaries' Company, were no more to amuse themselves and waste their funds in prosecuting and hunting down every two-legged animal that gave one dose or even several doses of physic, without possessing the license of the Company, yet every clause of the bill, by defining the education, the rank, and the position of the members of the profession, was intended to protect and honour the regular and qualified, and expose and degrade the unqualified practitioner. Lastly, they were well aware that, though it is utterly impossible for any Act of Parliament to give any man or order of men either honour, or rank, or respectability, yet, so far as any legislative measure could insure such objects, the tendency of every clause of the bill was to give the great body of the general practitioners a more fixed and respectable position than they had previously occupied. For physicians and surgeons, members of colleges, the bill could do and probably will do little or nothing. It cannot elevate them higher than they are. Their position is as it were determined,—depending partly on their education, partly on the bodies with which they are connected, and still more certainly on individual talent, merit, and reputation. The general practitioners, on the other hand, would be by this measure the greatest gainers, and they, of all men, ought to have been the last to raise the cry that the craft is in danger.

In raising this outcry, in censuring this part of the Bill, and in proposing the remedy by which they think the evil is to be averted, they have been at least consistent. At a great majority of the meetings of these gentlemen, held chiefly in the south of England, while they condemned loudly this provision, and sometimes censured the whole Bill in no measured terms, they called no less vociferously on the Legislature to provide the means of putting down quacks and unlicensed practitioners by legal means, and extirpating from the land every form and variety of quackery. While they allowed that the Apothecaries' Act was either naught, or at most, not at all a good measure, they contended that, in this respect, of possessing the power of prosecuting and punishing quacks and unlicensed practitioners, it was excellent, and that while this power ought to be continued, the Act might be easily improved.

This showed clearly where the grievance lay, and developed the nature and dispositions of the aggrieved parties. It showed not only the love of the ancient spirit of monopoly and exclusive rights, but the consciousness, we say it with grief and reluctance, that they were unwilling or unable to rest their claims on public confidence and patronage on the solid ground of professional merit and character, but on the adventitious powers furnished by legal enactments. On the impropriety and the imprudence, as well as the impracticability of this course, we said so much in our last Number that we are both unwilling and ashamed to resume the subject. A few observations, however, we must add, in the hope that those to whom they are addressed, are not entirely deaf to common sense and experience.

The question as to suppressing irregular or unlicensed practice and quackery by legal enactments resolves itself into two points. The first is, what constitutes quackery and unlicensed practice; and the second is, can this be suppressed by legal enactments?

Now, with regard to the first of these questions, though it may seem easy to define unlicensed practitioners and unlicensed practice, it is by no means easy to define quacks and quackery. Unlicensed practitioners must mean persons practising medicine, surgery, and midwifery without any kind of license. Even here, however, we encounter a difficulty in this circumstance, that, if we adhere to the letter, many persons are licensed to practise medicine who are not licensed to practise surgery; very many are licensed to practise surgery who are not licensed to practise medicine, yet who do practise it, and, we believe, with advantage to the public; and many practise midwifery without any license whatever so to do; and the suppression of which would be a great and serious injury to the public. It may indeed be argued, that, as the greater includes the less, and as medicine includes surgery and midwifery, therefore, a person licensed to practise medicine is also capable of practising surgery and midwifery. It is very singular that the

converse of this proposition is much nearer the actual fact ; and the only case, in which it can be said, that one license includes several qualifications, is, that the person licensed to practise surgery practises also both medicine and midwifery.

This, however, is not the great difficulty. It consists simply in this, that a person, be he doctor or surgeon, may practise medicine or surgery as much as he chooses, and as those who consult him give him opportunity, that is, he may bleed, blister, purge, sweat, diureticize, and mercurialize patients as much and so long as he chooses, if he do not supply the means by which these various functions are performed. The moment he spreads a blister, or dispenses a few grains of calomel, or squill and digitalis, he places himself within the fangs of the Apothecaries' Company.

It must be again observed, that this system is the result not so much of the wishes as of the necessities of the profession, of the circumstances in which practitioners are placed by the great mass of the public, and of the public themselves. Among those who require medical advice or treatment, but few are inclined to apply to the physician or surgeon, pay for his advice, and then make a second payment to the chemist or druggist for the medicines ordered. Few think of this unless the educated classes of society. Fewer still are inclined or able to pay for it. The great body go therefore at once to a person who deals in medicine and drugs, and who is therefore supposed to deal in medical skill and medical advice, and to such a person they pay at once for the advice and the medicine, or in paying for the medicine they pay for the advice.

From this habit of the people, it results that almost all practitioners are obliged, at least at their commencing business, as it is called, to supply medicines also, and to continue this system for years, until they are, what they conceive to be, fully established. Then, and not till then, they cease to keep the shop, or surgery, as it is sometimes, by a species of euphemism, called ; and then, if they can obtain a partner who pays a handsome sum, they rise to the dignity of prescribing and visiting medical attendants, sometimes of physicians. Without this combination many would obtain no patients ; assuredly they would receive no fees, or pecuniary remuneration ; for it is an extremely difficult thing to make male or female understand that payment should be made merely for putting a few questions, feeling a pulse, looking at the tongue, placing the ear on the chest, and giving a few directions in writing or prescription. The great body of patients, especially of the middling and lower classes, cannot understand this. They think that they receive little or nothing, because there is no palpable article ; and they argue that they ought to give as little in return. Let the practitioner or adviser, however, accompany his advice with a

box of pills, a phial of medicine, or a packet of powders, a plaster, an embrocation, or a lotion, and the business is done. Something he here receives, and he accordingly gives something in return, and gives it willingly and gratefully. It is nothing to the purpose whether any of the medicines given remove his complaints and make him well, or even though they make him worse. A palpable article he sees and employs according to the directions ; in that he reposes confidence ; for that he gives his money.

All this the apothecaries, when they were chemists and druggists, well knew ; and as they saw that the great basis of lucrative medical employment was the keeping and dispensing of medicines, they determined that no one should enjoy this valuable privilege without their permission and sanction, regularly and duly obtained. If any one, however well informed in medicine, surgery, or midwifery, did dispense medicines without the permission of the Worshipful Company, then he was a transgressor, then he was an unlicensed practitioner, and then he was amenable to prosecution and punishment.

It thus appears that irregular or unlicensed practice consists, according to the apothecaries, in dispensing medicines without the authority and permission of the company. We know not that they have gone so far as to say that this is quackery. But if they have not said it, they have acted as if they thought it. It is at all events clear that this is the unlicensed practice to put down and abolish which, they invoke the powers of the legislature. A man may have received a most comprehensive medical and surgical education, may have enjoyed the best opportunities of acquiring practical knowledge in his profession, and may have most diligently availed himself of all these, yet, if he attempt to practise the art anywhere in England or Wales, and at the same time to dispense the medicines which he finds requisite, he is denounced and prosecuted as an unlicensed practitioner. That this is the fact the apothecaries know. Should the measure that proposes to stop this abuse be considered bad ? Should this power be continued or not ? Surely every one that wishes the respectability of the medical profession and the good of the public, must allow that it ought not to be continued.

But what is understood by quacks and quackery ? A quack is a person who pretends to knowledge which he does not possess, who promises to do what he is either not sure that he can perform, or what he is certain he cannot perform, who represents his practice to be more successful than that of other men, who pretends to cure diseases known and admitted to be incurable, whose manner is confident and imposing, whose tone and language are unhesitating and boastful, who employs remedies, the nature and composition of which he keeps unknown, and who deals in spe-

cifics and universal remedies. He is also addicted to handbills, newspapers, and similar modes of making known his pretensions and proceedings. This is the quack; and the conduct of this man is quackery. We have now to ask the apothecaries and the general practitioners the question, are this character and conduct never found except without the pale of the profession? Are there none among the regularly licensed practitioners who act in the manner above designated? We think that not a few will be puzzled to answer the question conscientiously in the negative; and the company would do well to consider the possibility of their being obliged to prosecute numbers of the licensed members, if they sincerely and earnestly wish to suppress quackery and extirpate quacks. It is not the quacks without the pale of the profession only to whom the legislative penalties ought to be applied. It is of no use to abolish quacks of one order if those of another are tolerated.

The next question for consideration is, is it possible, by legislative enactments, to suppress this unlicensed practice, or to eradicate quackery out of the land? We answer without hesitation, it is not possible; and this we do, not only from our conviction of the difficulty of applying legislative enactments to such offences, but because we believe that unlicensed practice and quackery has its origin, and owes its success to the natural constitution of the human mind, and to the general habits of society. Were it not that the public encourage irregular and unlicensed practitioners, these persons would never thrive. But, partly from curiosity, partly from the love of something new, extraordinary and unusual, and partly, also, it must be allowed, from the natural wish to obtain relief in painful disorders, health and strength in infirmities, and hope and confidence in maladies which fill the stoutest mind with despair, people are at all times willing to obtain assistance, which they are led to believe is to be efficient and successful. It is chiefly in tedious, chronic, and oftentimes painful disorders, and in organic and incurable maladies, that the influence of the quack is sovereign. It is in the former tribe of maladies that hydropathy, homoeopathy, and mesmerism are so successful, and precisely for the same reason, because they operate on the nervous system and mind of the patient, and because they enable the strong mind to act on the feeble. In these the cure, when it is effected, is accomplished partly by inspiring hope to carry the patient through the time requisite for recovery, partly by procuring time, and partly by allowing the system to call forth the aid of those powers with which it is endowed by Creative Intelligence. In organic and disorganizing maladies, the principle of influence is a little different. A person with cough, short breathing, quick pulse, and expectoration, goes to the physician, who after examination recog-

nizes the existence of tuberculation of the lung with the physical signs of three or four vomices. His integrity prevents him from saying that he can cure this disorder ; but he admits that he can relieve the symptoms. The quack is incumbered with none of this delicacy. He can cure tuberculation and *vomicæ* of the lungs ; he can cure consumption. He speaks in a confident tone ; and the patient believes his assertions. He forthwith prescribes ; the patient gets a little better for a time ; but the disease proceeds in destroying the lungs as usual ; and death ensues just as certainly as in the regular practice. Yet patients continue to flock to these kind and bold deceivers.

It is a fact established by incontrovertible evidence that this system of procedure is not confined to extraprofessional practitioners. It takes place within the pale of the profession. One physician alleges that he cures consumption by tonics, stimulants, and nutritious diet. Another tells you hydrocyanic acid is the great remedy. A third exhorts you to place all your confidence in cod-liver oil, which in his hands has rescued many from the tomb. A fourth assures you, with equal confidence, that exercise on a jaunting car is the most likely means to be useful. A fifth comes forward with a phial of naphtha, and here, he says, is the elixir of life. Whom in this great host of authorities is the patient to trust ? Some one he must trust ; for credulousness, or rather the tendency to believe, is inherent in the human breast ; and the principle becomes stronger, as the individual is enfeebled by the inroads of disease. Even St John Long was not more unreasonable than those that have preceded or followed him even among the regulars. He caused his patients to breathe medicated air. Dr Beddoes and Dr Darwin, and their followers, did this before him. He employed counter-irritation. The same was done by Dr Mudge on his own person, and on that of many others, by Carmichael Smyth, Schroeder, Larrey, and many other practitioners. The chief error that he committed was in being indiscriminate in its use,—an error common to all routine practitioners, and in not calculating on the effects of a potential caustic in a delicate young woman, probably of strumous habit. It must be admitted that even this great pretender did not go farther than those who assert they cure consumption by tonics, by hydrocyanic acid, by cod-liver oil, by the jaunting car, by naphtha, or by homœopathy, by hydropathy, or by mesmerism.

All this we have said for the purpose of showing the conclusion of the whole matter. It is clear that quackery has its origin, and owes its success to the tendency to believe in the public mind ; and to attempt to suppress it by act of parliament, implies the previous attempt to alter the constitution of the human mind by act of parliament. These learned Thebans, the apothecaries, know best whether they can accomplish this psychological phenomenon.

To the suppression of unlicensed practice and practitioners, however, there is yet another impediment, with which we should be glad to know in what manner the remonstrants propose to deal. There are two classes of medical practitioners who are of the greatest use to the great mass of the people, who, however, have never yet been required to be licensed. These are the chemists and druggists in their counter practice, and the midwives.

With regard to the former, we know it will be said that provision ought to be made for their sufficient education, and public means ought to be taken to ascertain their fitness at least for dispensing medicine, and for compounding preparations according to directions. In point of fact, this is already done in many places; and in this country many of those who keep shops, and confine their attention to the business of the shops, are regularly educated medical men, and either have or might have a surgeon's diploma. We confess that we are favourable to the plan of enforcing a certain amount of chemical and medical education upon this order of persons; we do not pretend to say how much.

It is clear that they ought to understand the elements of chemistry and chemical pharmacy, *materia medica*, toxicology to a certain extent, and perhaps as much practice of medicine and surgery as may suffice to give them a general idea of the diseases in which each remedy is administered. This, it may be said, implies a great deal. It may be so, but it is manifest that it is impossible to dispense with less. We take it for granted that it is impracticable to prohibit this useful class of persons from giving advice and assistance when requested so to do. Indeed, no legislative enactments could prevent them.

The midwives, the *Hebammen* of the Germans, are not less, perhaps more requisite. To them all the lower ranks of married females, and many of the middle orders, trust entirely; and it is only in great emergencies that additional and regular obstetrical aid is required. In ordinary circumstances also they appear to be perfectly competent to the duty;—patient, attentive, and cautious; and whether it be that the process of parturition is in ordinary circumstances free from danger, or that much knowledge is not required, it is remarkable that in their hands the mortality either of parturient females or infants is small.

What, then, is to be done with this important class of practitioners? Are they to be prevented in all time coming from giving aid when required, and which any married female is often capable of affording? are they to be entirely extirpated, or are they to be erected into a college or an obstetrical company? For this the bill makes no provision; and we infer that these respectable females are to be allowed to pursue their vocation, undisturbed by legislative enactments.

This, we think, is the safe plan. It is manifest that it would

be a harsh exercise of power to compel any female, if she wishes to be attended by one of her own sex, to have the attendance of a male accoucheur when in childbed. Without intending anything offensive to obstetrical practitioners, we must remind them that the institution of midwives has high antiquity on its side ; that it is further favoured by motives of delicacy ; and that many respectable members of the medical profession entertain the opinion that the female midwife is both a safe and competent attendant.

We have here gone to the root of the evil. In our last article, we adverted to the difficulty of applying legal enactments, to be found in the disposition of juries, the difficulty of proving irregular, unlicensed, or quackish practice, and the compulsory and restrained system that is implied in the whole procedure. It is unnecessary to recur to the subject. We conclude this part of the subject by expressing our confident belief that it is physically as well as psychologically impossible to suppress quackery by means of legal enactments or penalties of any kind.*

The twelve subsequent clauses of the bill, from the second to the thirteenth inclusive, provide for the establishment of a general superintending or controlling board, under the name of the Council of Health, for the formation of that board, its powers and duties, and the general mode of performing the latter.

This portion of the bill has, like the last, encountered a degree of censure and obloquy, for which it seems impossible to account, unless on the grounds of determined and factious opposition.

It is remarkable that one of the great subjects of complaint, among all members of the profession, was the exclusive rights and privileges of the medical corporations, and the despotic and tyrannical mode, as it was termed, in which these rights were represented to be exercised. Now, one of the main functions of this supreme board or council will be to exert a general control over the corporations, and see that they do nothing harsh, oppressive, or unconstitutional.

Another evil of the profession, felt by not a few, was, that they had no recognized position in society, unless as in connection with colleges, and these were more of the character of clubs than civil establishments. It appears to us that this supreme council must be of use in this manner, that it will invest the profession generally, and its members individually, with a greater degree of weight and importance than they at present possess.

The question as to the propriety of this institution resolves itself into two points ; the first, is a supreme board or council requisite or expedient ? the second, how is it to be constituted ?

On the first point, it seems scarcely reasonable to deny that

* For an example of the difficulty of proving irregular or unlicensed practice amidst the clearest evidence, we refer to the *Medical Intelligence*.

there should be some body or board with a controlling or regulating authority. As the profession was and is constituted, it may be said that each division of the empire has controlling or superintending boards, though, in the lapse of time, the profession has as it were outgrown the powers of these boards. It will scarcely be denied, also, that, if a union of the three kingdoms were a judicious course, something like union in these separate boards was also desirable, and perhaps necessary. This union is, as nearly as possible, effected by the supreme board, which has further the advantage of connecting the subordinate boards in this manner with the Government. By its means, through the agency of the provisions of the bill, it will give these boards, what they have never hitherto had, a co-ordinate jurisdiction over the members of the profession, and it will thus be the means of placing all professional men of the same education and same professional rank on a footing of perfect equality.

Some, we know, have said that the medical profession should be allowed to govern themselves. This is, in some sense, what has been going on in this country ever since they were a profession, at least it may be said for the last century, and what is the result? Most complete anarchy, or no government at all; all confusion, disorder, and irregularity. The idea of the medical profession governing themselves is completely Utopian; and, we must say, from what we see and know, without meaning the least offence, the members of the medical profession are less fitted for governing themselves than almost any other body that we know. To the causes of this it is unnecessary to advert. But we venture to assert, that, if the profession had the power of self-government, it would give rise to discontents and jealousies more serious and more lasting than any we have yet seen. We take it for granted that our professional friends are ready neither for perfect democracy nor for anarchy and confusion, and, therefore, the only alternative is some supreme body similar to that proposed in the present bill.

It must be further said in confirmation of the necessity of having some controlling and general superintending board, that almost all those who have thought much on medical reform, and the means by which it was to be effected, have recommended some supreme board of this description. We fear, from the temper displayed by some of our professional friends in the south, that they will not consider it a great recommendation, when we inform them that, so far back as the year 1838, a board of this kind was recommended by the College of Physicians of this city, in a sketch of a plan which a committee of that body drew up for that purpose. But the friends of medical reform generally, ought to look at least with impartiality and attention on the suggestions of others who, in distant and remote parts of the kingdom, have,

without any concert or communication, suggested the same institution. Thus Mr Green, one of the most intelligent and best-informed surgeons in London, in an able tract on Medical Reform, published in 1842, proposed the institution of a State Council for medical affairs, and assigned for the plan reasons, which every one must allow to be highly conclusive.

"If then," says Mr Green, "I am right in considering these as the main grounds of the grievances complained of by many members of the profession, and implying a serious drawback on the utility of the medical profession to the community at large, it cannot be doubted that for their rectification and removal, the most pressing need, offered for deliberation to the legislature, is that of forming an efficient *head* for the government of the whole profession, so constituted and vested with such powers as shall secure, under varying circumstances, the unity of the profession, in accordance with its final aim and intention. In considering this important condition, both of the stability of the profession, and of its efficiency, in connection with the national interests, various plans will suggest themselves, but probably the establishment of a STATE COUNCIL FOR MEDICAL AFFAIRS will be found to be most in harmony with our institutions, and congenial to our habits, and will be best calculated for providing an effective bond of union in regulating and protecting the interests of the different departments of the profession, as *one body*, having an essential community of interests and objects ; this council emanating from, and responsible to, the Government of the country for the efficiency of the profession, and for the performance of its duties, private as well as *national*.

"Besides the reasons which we have urged above, for the institution of a supreme authority, derived from the consideration that the regulation of the profession, the interests and objects of which are the same, is entrusted to various bodies—not only to those in the metropolis, but those of Scotland and Ireland—having different views and interests for the interference and collision of which no feasible means of assimilation, however desirable, at present exist ;—besides these reasons, I say, it cannot but be deemed expedient that some authorised tribunal should exist, to which real or supposed professional grievances and legitimate complaints might be referred, and from which inquiry or redress might be sought, without the suspicion of fear or favour in the judges, especially if we consider the various symptoms of disunion in the profession, the charges and accusations against the governing bodies who have not the means of defence or reply, and generally, the rancour and hostile feelings which vent themselves in pamphlets, newspapers, associations, and in meetings private and public. But perhaps beyond all these reasons for instituting a control over the medical corporate bodies, as at present constituted is their *irresponsibility*,—which indeed is alleged as one of the strongest grounds for a reform of these bodies, and as one of the evils most urgently requiring correction. For, whatever may be the validity of the charges of malversation upon which the allegation is founded, we cannot conceal from ourselves the truth that the responsibility claimed is no other,

nor more, than that which may justly be required of corporate bodies who are the stewards of great public interests, which seriously affect not only the medical profession, but society at large and the state itself, and which imperatively demand honesty in the disposal of large funds, and ability and impartiality in all their functions, regulative and administrative. It is very true that the principle of responsibility is already recognised in respect of the necessity of the confirmation of bye-laws, and generally in respect of the amenability of chartered bodies to the Court of Queen's Bench ;—for the sovereign being legally the founder of all corporations is, in the absence of any other expressly appointed, constituted by law the visitor of the same ;—but it will scarcely be asserted that the principle can be fully and fairly carried out without some more immediate supervision and control, than are exercised at present ; and it can hardly be doubted that the proposed council or board might be made efficiently operative for the control of the various medical corporations, itself being under a known and ascertained responsibility to the government and legislature. Substitute for this the responsibility of the corporate authorities to a body of electors, and you wrest the great national interest, which is included in the well-being of the medical profession, from its rightful guardians, and leave it at the mercy of party spirit and of private interest.”—Pp. 43-46.

Sir Richard Carmichael, also, in a tract published in 1841, is desirous for a similar arrangement, differing, however, in this, that he proposes one council in each of the three metropolitan cities. This appears to us a less eligible plan than that which we have seen is proposed by Mr Green, and adopted in the bill. Even admitting that one council or superintending board might be established in each metropolis, it would still be necessary to have some supreme board in London in communication with Government in order to give efficiency, weight, and authority to the local councils. In short, we see not how the supreme council can be dispensed with, and we believe it to be quite necessary to the efficient operation of any measure of reform in medical education and practice.

The same idea of the necessity of some central board is favoured by Sir James Clark ; and though many may hesitate subscribing to all his doctrines on the subject of medical reform, we think that the opinion of one, who has reflected much on this subject, and who, we know, is perfectly sincere in his wish to promote the true interests of the profession and the public welfare, is entitled to particular attention.

“ In addition to the three examining bodies or universities,” says Sir James Clark, “ a central board would probably be necessary for fixing and assimilating the course of education, preliminary and medical, and for making such changes in the subjects of study and mode of examining, &c., as may become necessary in the progress of science. It is reported that the Government have the intention

of establishing such a body ; to be composed partly of medical and partly of non-medical men. Such a board, if well organised, would, I believe, be of great utility in the country. It would constitute a board of reference to the Government in all matters relating to the public health, as well as a board for regulating medical education."—First Letter, p. 20.

We here observe the proposition of some central superintending board advocated by authorities of the most opposite characters. We do not say that the adoption of any untried measure should be decided by authorities alone. Such a decision must be founded not on authorities only, but on the reasonableness, the practicability, and the necessity of the measure, considered in all its lights and bearings. When it is remembered how much irregularity, disorder, and confusion have prevailed in the profession, we must say that any measure which appears calculated to introduce uniformity and order ought to be candidly and fairly considered, and received with good feeling and thankfulness. We know well that nothing can be worse than the present state of matters. Let us therefore try the device of the supreme council or central board, which, there is every reason to believe, will introduce very considerable amendments.

Admitting, therefore, the necessity of a superintending board or supreme council, the next question to be considered relates to the mode of its formation and its constitution. This point has also given rise to much hasty criticism and censure ; and everything unbecoming has been said of the motives imputed to the Right Honourable Home Secretary in the mode of constructing the board. Now we think that if the censorious persons now referred to had rightly considered this matter, they would have seen the great difficulties attending the formation of a proper supreme council, and if they did not make choice of the exact plan suggested by the author of the bill, a little observation must have convinced them of the impracticability of deviating very widely from it. The representative system is the great object of their wishes ; and we willingly admit, that, if practicable, it would be very desirable to construct this board on the principle of the representative system. It is quite clear, however, that the proposers of this method have advocated the representative system, because it is the fashionable system in political measures, because it sounds well, and because every one who wishes to be popular and to be thought patriotic, eulogises the representative system. In all this magnificent panegyric on the representative system, however, it is totally forgotten that medical practitioners, if in any occupation at all, cannot leave the locality in which they are fixed, for the purpose of coming to London or any other place, and performing there the duties required of members of the supreme council. To do so a physician or surgeon must either be independent of pro-

fessional occupation, or have no professional ties whatever. The result would be, that none could attend except gentlemen doctors, who would take little interest in the business, or persons would be appointed whom it would not be desirable to have. These circumstances oblige us to conclude that the most of the members of the council must either be selected from those residing in London or not very far from it, or from those members of the profession who have no strict professional ties.

We have no means of knowing to what extent several of the lecturers and teachers in the universities may come under the exception last mentioned; but it is very difficult to see how physicians or surgeons in practice could perform the duties of members of council.

The representative system, nevertheless, is acted upon as far as is practicable.

The mode of forming the council proposed by Mr Green may be understood from the following extract.

“If then the remedy for the evils above adverted to is to be sought in the projected council of state for medical affairs, the consideration of its constitution and of the mode of its appointment cannot be wholly passed over; and perhaps the following hints may be available in the settlement of the grave questions which these subjects involve, and which must await their final adjustment by the consent of parties seriously affected and variously interested. 1st, As the functions of the council will be *deliberative*, it should consist, as is indeed implied in the name council, of *various* members; though for the dispatch of business it is evidently desirable that they should be as few as the nature of the constitution of the council permits. 2dly, As representative of the different corporate bodies,—if the principle of representation be adopted in the constitution of the council, though it is not essential to the plan and involves some serious difficulties—as representative, I say, of the corporations, the proceedings of which are submitted to it for discussion and approval, and as reciprocally influence of the proceedings of the corporate bodies, which it regulates, the council might consist of members from each of the medical corporations of the United Kingdom;—whether from all the departments of the profession, whether one or more from each, and whether in like proportions from every one, we leave here undetermined. 3dly, As the corporate bodies must be best acquainted with the capabilities of their own members and their relative fitness for the duty required, we anticipate no objection to their *nominating* and *recommending* their representative in the council; but, as the functions of the council imply pre-eminently *duties* to the profession at large and to the country, we expect that the right of *appointment* will be claimed by the crown. 4thly, As the council is to be the depository of a trust for the benefit of the nation, and therefore a functionary of the government, we must anticipate the addition of *lay assessors*

appointed by the crown, though the reason assigned does not warrant us in expecting that they will form more than a small proportion of the members, or that they will be other than judicial authorities or legal advisers, and one of the members of Her Majesty's Government.

" Thus might be formed an institute, in the service of the state, giving unity and increased efficiency to the medical profession, to which various important functions would necessarily be assigned in behalf of its aim and intention. As invested with authority for assimilating and controlling the proceedings of the medical corporate bodies of the empire, all *bye-laws* and *ordinances*, emanating from these for the regulation of their own administration, or of the practical departments of the profession, over which they preside, would be submitted to the state council for its *approval* as the *indispensable condition of their validity*. Though we have no design of recommending that the functions of the different corporate bodies, legislative and administrative, should be altered or impaired, seeing that they will severally be best informed in respect of the needs and interests of their respective departments, varied likewise as they must be by circumstances of *locality*, and desire only such powers to be granted to the state council as may prevent abuses, assimilate as far as possible partial enactments, as may enable it to give that uniformity of qualification to practitioners in their respective departments, which shall remove all restraints imposed by particular privileges,—in short, such powers as may qualify it to bring about a uniform code of legislation for the profession without the inconveniences and dangers of innovation, and in accordance with the wants, objects, and dignity of the profession, and with the interests of the country. We have likewise no intention of recommending that the proposed council shall have any power of disposing of, or controlling, the *funds* of the corporate bodies ; though we see no objection to the account of receipt and expenditure being laid before it. Thus then, without interference with the specific functions of the existing corporations, without any turbulent innovation, the state council for medical affairs would form a completing bond and uniting head of the profession, in providing for a conformity of the education and qualifications of practitioners in their several departments, and for a uniformity in the privileges of qualified practitioners in their respective departments, whilst it would constitute a body for deliberating on all matters relating to the profession at large throughout the kingdom and its dependencies."—Pp. 46-49.

This does not differ very widely from the plan recommended in the act. Five members are *ex officio*, in consequence of holding professorships in universities. Six are chosen, after the first nomination, by the Royal Colleges, as representatives of these bodies. And six, who are understood not necessarily to be professional, are to be appointed by her Majesty, with the advice of the Privy Council. The total number of the members of Coun-

cil is thus eighteen, one of the principal Secretaries of State being officiating member and president, (10), he also naming as vice-president one of the other seventeen.

The only circumstance calling for particular remark in this arrangement is the appointment of the five *ex officio* members. In most circumstances *ex officio* members are either simply useless, by not attending to the duties, or they are positively hurtful. Whether this will be the case with the *ex officio* members of the council of health we have no means of knowing. But we think that this part of the system might be improved, though we honestly confess it is difficult to know how to procure substitutes.

Much censure has also been bestowed on the mode in which the decisions of the council are understood to be directed to be formed. By the eleventh clause of the bill, it is provided that "all acts of the council shall be decided by the votes of the majority of the members present at the meeting, the number not being less than seven; and at all such meetings the president for the time being shall have a second or casting vote in all cases of equality of votes." Now it has been said that, as six members of the council are appointed by Government, and as the Home Secretary or his deputed representative is president, all measures may be accordingly determined entirely as the government members desire. To this representation the answer is, that the representatives of the colleges must attend to their duties, and if there be any chance of a measure believed to be prejudicial to the profession being brought under the consideration of the council, they ought to consider it carefully, and act according to the best of their judgement. That the apprehension, however, now stated is either groundless and imaginary, or never likely to be realized, we infer from many circumstances. We can see no reason why six members chosen by Government should have either any desire to support any measure prejudicial to the profession, or any interest in doing so. We have good reason to know that these members will be so selected, that it cannot be imagined, that they would be under the influence of any feelings or views which would lay them open even to the imputation of supporting measures detrimental to the profession at large. They will be chosen from the order of men of extensive education, perfect knowledge, enlarged liberal views, and the highest character for integrity and honour. It seems at once childish and absurd to suppose that the individuals composing this part of the council would stoop to local or party interests, or that they can have any object in view but the public welfare, in the discharge of a great and honourable public duty, in which the eyes of the public as well as the profession are upon them.

It has been further asserted, that the principle of responsibility

may be disregarded by Government in the appointment of these six members. To this, all that we answer is, that, in the present state of the public mind, we would much rather have this responsibility thrown on the Government than on any other body or order of individuals. We have no fear that the responsibility will not be felt more forcibly by the minister of the Crown, whoever he be, than by any body of men, among whom it is invariably divided, dispersed, and therefore lost.

Of the 13th clause, one part has been made the subject of censure in a manner so reckless and precipitate that it illustrates in a striking degree the manner in which the provisions of the bill have been examined, and too often condemned. It is there directed that, under the inspection of the council, a register of all persons examined and found duly qualified as physician, surgeon, or licentiate in medicine and surgery, shall be kept, and from time to time published; and it is further provided that for this registry the council shall receive a fee of L.5 in the case of a physician or surgeon, and L.2 in the case of any licentiate, "which fees," it is added, "shall be applied towards defraying the expenses of this act."

It is a curious example of haste and misconception, that it was forthwith asserted that by this means L. 70,000 at once were to be levied from the profession. Had this clause been considered in connection with the 28th clause, it would have prevented the parties from making this extraordinary assertion. It is from that evident that the 13th clause applies solely to those who shall annually and from time to time enter the profession, not to those who are already in it. By the 28th clause it is distinctly provided that all persons legally qualified and already acting as physicians, surgeons, or general practitioners, are, when registered by the council, to pay a fee, in the case of a physician or surgeon, members or associates of colleges, of L.2; and of five shillings in every other case. We presume that there may be about 470 fellows and licentiates or associates of the College of Physicians in London, and the provinces. The number of members of the College of Surgeons in London and in the provinces who would refer themselves to the head of surgeon, we cannot exactly estimate. Let them be rated at 400. There are at an average about 100 fellows of the College of Physicians in Edinburgh and the provinces, and perhaps about 80 of the members of the College of Surgeons. This will make 1050 physicians and surgeons altogether. Let them be rated at 1100. This gives L.2200 exactly for those already in the profession. The numbers of all other practitioners in England, Wales and Scotland are estimated variously. Some time ago it was broadly asserted that in England and Wales there were 30,000; and upon this statement, indeed, it was, that the

estimate of the L. 70,000 above-mentioned was advanced. But it was not stated upon what data this estimate was founded. The number of those who possess the diploma of the College of Surgeons in London may amount to between 10,000 and 11,000, probably a few hundreds more; and if to this sum one-half more be added, for those who hold only the apothecaries' license, or the license of the College of Surgeons of Edinburgh or Dublin, perhaps it may approach the truth. This would give 16,500 for the ordinary medical practitioners of England and Wales. If the same proportion between the population of Scotland and its medical practitioners be observed, then the number in that country may amount to 2600; and if the two amounts now specified be conjoined for the whole of Great Britain, it will give 19,100 for all the general medical practitioners of Great Britain. Another statement has recently appeared, according to which it is said that in the whole population of Great Britain, that is, England, Wales, and Scotland, amounting to 18,884,434, there are 22,187 medical practitioners. As this includes physicians and surgeons also, it does not differ very much from the estimate above given; and we therefore adopt the latter, which is said to rest on correct data. If we, therefore, take the general practitioners at 20,000, in round numbers, the sum to be raised in this manner is exactly the fourth part of L. 20,000 or L. 5000. This, however, is to be raised only once; and the annual revenue will not exceed, at the highest estimate, we believe, L. 2400 or L. 3000. We see in this manner how very rash and unguarded, how hasty and incorrect are the statements made on this provision of the bill. A sum of L. 70,000 is reduced to little more than L. 5000, and adding the amount for the physicians and surgeons, it will be L. 7200. If, on other parts and provisions, the same recklessness and heedlessness take place, how is it possible to expect any rational views on the subject at all?

The clauses providing for professional instruction and the proper means for ascertaining its sufficiency come next. These may be said to be contained in the twelve clauses, from the 14th to the 25th, inclusive. An account of the provisions and effects of each clause would be little more than a repetition of the statements and directions contained in each, and would probably fail to place their peculiarities in a clear or instructive point of view. A preferable plan will be to give a sketch of the whole, viewed in their mutual bearings on each other.

And, in the *first* place, it is to be observed, that all the old examining, judging, and qualifying boards are retained; even the Apothecaries' Company; and in the position in which the latter are placed by the act, they have not only no reason to complain, but every reason to be satisfied. No single board, however, is to

be allowed to act as an examining or certifying authority. The concurrence of more than one body or incorporation is in all cases required for qualifying any person to be registered by the general council. And the examination by these joint bodies may be conducted, either separately before examiners appointed by each body, or before a joint board of examiners to be appointed by each body separately or conjointly. All difficult or doubtful points, as to the times and places of examination, are to be determined by the supreme council.

Secondly, As it is manifest that the great object of reform in medical education and qualification, is to provide an order of sufficiently educated general practitioners ; as it is manifest that if care be taken that this order be sufficiently educated, the education of the physicians and surgeons may be left, in a considerable degree, to themselves ; and as both of the latter orders must, in order to maintain their superiority, always possess an education both general and professional, more ample, more comprehensive, more accurate, and of a more elevated character than the general practitioners ;—so the great object of the bill is to insure this purpose in its most complete form.

The examining boards for this order of practitioners in the United Kingdom are, for England, the College of Physicians of England, the College of Surgeons of England and the Court of Examiners of the Apothecaries' Company ; the Colleges of Physicians and Surgeons in Scotland, for Scotland ; and the Colleges of Physicians and Surgeons in Ireland, for Ireland. The proof of qualifications consists in the candidate receiving letters testimonial from each of these bodies, in the respective countries, in which he undergoes examination.

It appears to us, that an examination conducted on the principles now specified, followed by the corresponding letters testimonial, cannot fail to insure a body of well educated general practitioners. The great complaint always, and not without reason, urged against the education of this body of persons, was not only the irregularity of the courses of education demanded by different bodies, for men who were understood to have the same professional rank, but the strong and glaring fact, that before different boards the examinations were not only different in subjects, and in the importance attached to each branch, but very different indeed in the degrees of strictness of each examination. Thus the candidates for the diploma of the Colleges of Surgeons of London and Dublin were examined principally, if not solely, on anatomy and surgery ; and if they showed good knowledge of these two subjects, they might be very ignorant of the principles and practice of medicine, know scarcely the doses of several remedies, and be wholly ignorant of midwifery. Those who graduated at universi-

ties also were expected to know anatomy, physiology, and medicine well ; but as to surgery and midwifery, they were often very slenderly informed, and, at all events, had little or no practical knowledge of these subjects. All this inequality and inefficiency will assuredly vanish before the examination of the joint boards. The candidate will have to prove his attainments in each department before the representatives of each board ; and when he comes before the public, with the stamp of competency, it will be impossible to say that, in any department of medical or surgical knowledge, he does not possess the requisite amount of information to enable him to act as a safe and judicious medical practitioner.

Some persons, we understand, have doubted the propriety of authorizing the examining court of the Apothecaries' Company to share in the duty of ascertaining the attainments, and certifying the competency of candidates. Perhaps with the examiners for the College of Physicians it was superfluous. But there is at least one subject, viz. midwifery, on which the Apothecaries' court may be useful ; and by their assiduity in raising the standard of education among their own body, they have, it must be allowed, done something to deserve this distinction.

Thirdly, Of the 15th and 16th clauses relating to surgeons and physicians respectively, the chief feature is, that the period of professional study is lengthened in both cases to the extent of *five years*, and that the surgeon cannot register as such till the age of twenty-five years, or the physician till the age of twenty-six. Surgeons are to be examined and certified by some one of the chirurgical colleges, or, as an alternative, by the Royal College of Physicians and Surgeons in Glasgow, a corporation into which the present Faculty of Physicians and Surgeons of that city is to be metamorphosed.

Fourthly, It is provided as to physicians, that, though the power of conferring degrees is to remain with the universities, the examinations for graduation are to be conducted not by these bodies solely, but by the university faculties, with assessors from the respective Colleges of Physicians of each country. Thus, Oxford and Cambridge and the London University will have assessors from the College of Physicians of England ; the Edinburgh faculty will have assessors from the College of Physicians in Scotland ; the Aberdeen faculty the same ; and the Glasgow faculty either from that or the newly-created College of Physicians and Surgeons in that city ; while the Dublin faculty will have assessors from the King and Queen's College in Ireland.

Regarding the duration or amount of studies required to be taken within the walls of universities and from university teachers, it results from the provisions of the 20th clause, that it is not to be compulsory on any candidate for graduation to reside longer

than *two* years at any of these institutions. No doubt can be entertained, that this abridgement in the duration of residence at universities is imperiously demanded by the spirit and practice of the age. We belong not to that class of reformers who see no good in universities. While we are satisfied that they were at one time most useful in keeping alive the sacred flame of literature and knowledge, we must allow that the performance of this useful duty is not at present confined to these institutions. Much learning and much science is taught without the universities, and fortunate it is that such is the case. Much medical and surgical knowledge especially is both acquired and taught beyond the pale of the universities. The school of the observant and sagacious physician is the world at large, populous towns, and large hospitals. Hence, many a good physician may be and is made, without ever having been within the precincts of a university. This renders it necessary to consider whether the honours conferred by universities, and upon those educated at these institutions, may not be conferred after a shorter period of mere university instruction than is commonly demanded. In truth, the time seems arrived for some generally recognised system of education, similar to that so long tacitly allowed by Oxford and Cambridge as to professional instruction, to be admitted into all the plans for conferring degrees.

There is in this provision only one circumstance, which, if not altered, may operate disadvantageously, and, perhaps, unjustly on those who have found it inconvenient to obtain the medical degree immediately after completing their university education. It consists in requiring the attendance either on university lectures or at schools recognized by any given university to be attended during at least *two* years *next* before the granting of such degree. Now there are and will be many well qualified candidates, who may in early life have undergone the two years' university education, and who may have entered into civil practice, the public service of the army or the navy, or the East India Company, that is, with the requisite qualification, and who, after spending ten or fifteen years in such service, may wish to obtain the medical degree. If this clause stand, however, as it now stands, such persons must previously undergo, once more, the full two years of university residence and study.

We respectfully submit to the author of the bill, whether this condition be not severe upon this order of practitioners, and whether the objects of the bill might not be equally well answered, by requiring two years' residence and study at the university at any previous time, not immediately before granting the degree.

This has led to a further innovation, proposed in the 16th clause, namely, the proposition to confer degrees on persons, who either having received no university education at all or a scanty one,

shall have attained the age of forty years, with the concomitant medical experience. It is accordingly provided, that, in such circumstances, examination by the College of Physicians in England shall, if the result be satisfactory, be a sufficient testimonial to entitle such a candidate to receive the honour of a medical degree, and to be registered by the council as a physician. It is not expressed, whether this degree is to be conferred after examination by the English College of Physicians, by a university, or by the College itself. We suppose the latter, in order that the universities may not be placed in the position of conferring degrees on individuals who have never been within their walls.

The same clause enjoins a very important and necessary change in the mode of recognizing the claims of persons having foreign degrees. It is now well known, that though at one period these degrees were held in deserved honour, yet, from the mode in which they are obtained from certain foreign universities,—too often by mere purchase and by persons in other respects without due or adequate education, they can no longer be estimated at the high rate at which at one time they stood. To obviate the pernicious effects of this venal system of degrading the character of the medical degree, it is directed, that no person possessing a foreign degree shall be registered by the council as a physician, unless he has obtained from one or other of the three Royal Colleges a special certificate to be submitted to, and approved by the council, stating that the College so certifying have made inquiry into the manner in which such degree was conferred, and have ascertained that it has been granted after residence within the precincts of the same university at least during *one year*, after due examination, and upon the production of satisfactory certificates of previous study.

In some respects this provision will be equivalent to a prohibition of the use of these foreign degrees. It is, however, a most salutary regulation, and by the flagrant manner in which these degrees are bought and sold, it cannot be doubted that the regulation is most imperatively demanded.

The reasons for this arrangement are too well known to require much explanation. We do by no means desire to exclude from what are commonly called the highest honours in the profession, able, and it may be industrious men, who, though, from various causes, without the advantages of university education in early life, are, as to knowledge, experience, and it may be added practical skill, equal, or superior to many of those who have obtained the degree in the regular manner. Neither do we think it necessary to require from such persons the same amount of elementary instruction, as in the case of young, and therefore less experienced practitioners. Many of these men may have undergone twenty years

of laborious professional exertion, and must have enjoyed consequently the fruits of twenty years' experience. Such labour is like that of the clinical hospital, and, if combined with private study and reading, may make any diligent student as good a physician, as a long residence within the walls of the university. In point of fact, the lectures at the latter institutions are chiefly useful in guiding the pupils in their reading, and unless associated with much assiduous private study, are of little or no avail. Persons, therefore, who have been long in practice, if possessed also of habits of reflection and study, may by such means compensate many of the deficiencies of early education. It is chiefly for such persons that the two provisions last mentioned are intended. And they will have the effect, we think, of separating the grain from the chaff, and the wheat from the tares.

Fifthly, The object of the 17th clause is principally to enable sufficiently educated persons to practise in any of the departments of the profession, which inclination, individual capacity, or local circumstances may render desirable.

The 18th clause is intended to remove the great and offensive grievance resulting from separate jurisdictions in the colleges of the three divisions of the United Kingdom. By this the medical practitioner, whether physician, surgeon, or general practitioner, who has, after sufficient examination, received from any one branch the diploma, or letters-testimonial, indicating his competency and rank, is entitled, if he afterwards feels it requisite, to claim the same rights and privileges from any other board in the United Kingdom, without, as at present, further examination. He is required, however, to pay the fees usually demanded, and to comply with all other conditions enjoined by the body-corporate or college.

The only condition which here can be made the subject of complaint is, if we understand this clause aright, the payment of fees a second time. It is perhaps not an objection so serious as the examining qualified persons a second time. Still it is a grievance in its way, and as such is, we think, likely to be felt, and made the subject of complaint. The only legitimate ground for exacting such fees, would be the fact, that the fees at different boards were different, and that the individual who had been certified by one board, charging a lower rate of fees, should, when he joins another board with higher rates, pay to the latter board the difference between the former and the latter.

In the *sixth* place, of the 29th clause, the object next to that of insuring proper returns from the respective boards to the Central Council, is to insure uniformity of qualification, and uniformity in the fees to be demanded, as far as is practicable and convenient. It is quite possible that it may not be practicable to insure

perfect uniformity in this matter; and if it be not, we must be satisfied with what is practicable. It would have been desirable, nevertheless, to insure perfect uniformity in these matters, seeing that the want of uniformity, at least in qualifications, has been one of the great and fertile sources of complaint.

It must be also observed, that, however desirable this object may be, it is not quite reasonable to expect that it can be attained at once. The sentiments of the members of different schools, though agreed on the principal points, differ, nevertheless, very widely on the respective importance and necessity of different branches of education. Thus in London, and in most of the London schools, the tendency of the examining boards, and accordingly of the teachers, has been to attach great importance to the practical branches, and much less to the elementary departments of medical science; and hence they have enjoined lengthened hospital attendance, while they have allowed short and often imperfect courses of lectures on medical science. In Edinburgh, on the contrary, it has been the custom to invest with great importance all the courses of elementary instruction, while hospital attendance, though not neglected, was allowed to be shorter in duration, because it was rendered more directly efficient by the system of clinical instruction, with which it was combined. There is reason to believe that the courses of lectures now delivered at University College, which agree with the Edinburgh courses in the importance attached to elementary instruction, may be useful in directing to this subject the attention of the teachers and pupils of the London schools, and may thus contribute to introduce a greater degree of uniformity in the medical schools all over the kingdom. This, however, must be the work of time; and it can only be after much interchange of opinions and sentiments, that the necessity of uniformity in instruction and qualification will be generally recognised.

In the *seventh* place, the process of graduation may be subdivided into two parts, that is, the candidate for graduation may become first Bachelor of Medicine, which he may do at the age of twenty-two years; and as every person so registered may practise as a licentiate in medicine or surgery, or as a general practitioner, it affords a great facility to those who may not at first have determined to graduate, yet who may wish eventually to have the power of doing so, and who may be desirous of acting in early life, and at the beginning of their career, in the subordinate, though useful occupation of the general practitioner.

In the *eighth* place, it is provided, that all students in medicine and surgery shall be registered as such, by proper officers attached to, or appointed by, the respective medical schools and hospitals. The fee for such registration, not exceeding ten shillings, is to be applied to defray the expenses incurred by the act.

In the *ninth* place, it is provided, that none but medical or surgical officers duly qualified, according to the conditions of this act, are to be eligible to any public office, any hospital, infirmary, workhouse, or other public charity, any prison or dispensary ; and that none but such as are qualified in this manner can be appointed to any office in Her Majesty's army or navy, or in the service of the East India Company, except natives, who are to be certified according to regulations made by the Governor-General in council.

These form the leading and essential provisions of the bill.

We think it cannot be denied by any one who takes a comprehensive view of this measure, that it is well calculated to accomplish the objects held in view ; and we have no doubt, that it will not only improve the great and useful body of the profession, the general practitioners, but that it will elevate the position and character of the profession, and increase very much their efficiency. We have allowed that we do not contend for the absolute perfection of the bill ; but we maintain that it is as perfect as the present state of the profession admits, and remarkably well suited to remove and rectify the abuses and evils, of which the members of the profession have long complained. It may be received as a fundamental measure, upon which various other reforms and improvements may be founded. The excellence of the changes proposed consists in this, that they are not so great as to supersede existing institutions, or entirely abolish useful modes of procedure to which the country and the profession have become habituated ; while they are sufficiently considerable to correspond with the improved and advancing spirit of the age, and to raise the medical profession to the wants of society. Upon ancient customs, and established institutions it ingrafts improved modes of education, and comprehensive and liberal methods of conferring qualifications. It introduces stability where there was uncertainty, regularity and uniformity where was only capricious anomaly, and it provides sufficiently ample qualifications where there was the greatest meagerness of information.

Before concluding, it might seem expedient to advert to some of the many schemes of reform which have been proposed by different persons and parties. This our limits prevent us at present from doing. We shall merely notice one or two schemes which have been more or less frequently brought forward amidst the fervour of the discussion. It has been proposed by some to unite all medical men in one faculty, without regard to the several orders, into which they have been distinguished ; to educate all in the same manner and to the same extent ; to ascertain their qualifications in the same manner and by the same standard ; and then to leave it to themselves and circumstances to follow whichever department of the profession or practice each chose.

The arguments in favour of this proposition are, that whatever be the distinctions, there is no such person as a pure physician or a pure surgeon; that it would render the profession more united, by abolishing invidious and artificial distinctions; and that it would elevate the character of the general practitioners.

It is here, however, totally forgotten that the distinctions now referred to are neither artificial nor created by the profession; that though physicians and pure surgeons are not so abundantly necessary as general practitioners, yet in certain situations, as in large and populous towns, and where there are considerable hospitals, infirmaries, and similar establishments, it is totally impossible to do without such members of the profession; and physicians in particular are required in all localities where population and wealth are united. It is a great mistake, indeed, to imagine that it is possible to introduce this system of equality, so dear to the fancies of democratical reformers. The distinctions into physician, surgeon, and ordinary practitioner are the results of a particular state of society,—are the effects of popular feeling, long-continued habit, and, it may be added, the constitution of the human mind. There is no such thing as equality in medicine any more than there is in the strength of different men, in the faculties of their minds, or in the structure of society. If equality were introduced to-day, there would be inequality to-morrow. So is it in the medical profession. Though it were ordered by act of parliament, that all the members of the profession should be equal in rank, education, and professional employment, inequality would take place in the course of one single week. The diligent, the industrious, and the judicious would have the advantage of the indolent, the unsteady, and the thoughtless. The shrewd and artful would overmatch the careless, the honest, and the simple. The bold and imposing would get the better of the modest, the timid, and the awkward. Were all the profession to be educated as general practitioners, as doctors of all work, in process of time, talent, opportunity, age, experience, and similar circumstances would elevate a certain proportion into the position of physicians and surgeons, and consulting physicians and surgeons, in order to advise their brethren, and give energy and steadiness to their practical measures.

Another fancy, we see, has taken possession of the minds of the general practitioners. They propose to have a college of their own, into which all the members may be united and embodied. The proposition has been represented by its friends and supporters to be most necessary in the present state of their prospects, to be most beneficial, and the only measure which can give rank, consideration, and weight to this numerous and useful body of men. These notions seem founded in error and delusion.

The plan is harmless, and will probably be free from any mischief, except to the general practitioners themselves. But it seems utterly incapable of accomplishing the beneficial consequences expected to result from it. Were such a college established, and were it deemed necessary to its welfare to hold periodical meetings, it is clear that these meetings would be attended by none but the London members, and those members resident within twelve or twenty miles of the metropolis; and even upon those the duty of coming to the city, and attending meetings which would occupy at the smallest computation about four hours altogether, deducting in this manner four hours from the business of the day, would prove no light or trifling tax on the time which should be devoted to professional pursuits and occupations. It would then result that the college of general practitioners would dwindle into a college of London apothecaries, the whole business of which would be managed by the London members. The proposition would not give union to the body of general practitioners. This is the first and most obvious result of such an arrangement.

In the next place, whatever be the individual respectability of many members of the Apothecaries' Company, and we willingly admit that it is very great, we doubt whether, if united in this manner in any college, it would do more than merely change the name. Such a college could not for a long time hope to have anything like the public consideration and influence possessed by the College of Physicians and the College of Surgeons. Without intending anything disrespectful, it may be said that in medical and surgical science they could have no place, no name, and no character. The natural course of things seems to tend in favour of the Colleges of Physicians and Surgeons, as they are now proposed to be constituted. To the same object the usages and wants of society seem to tend; and any institution which is thus related, and is the result of such agents, must, there is reason to believe, be at once necessary and beneficial.*

On this subject, however, we have no wish further to dwell. We have endeavoured to explain the operation and show the advantages of the legislative measure now proposed; and we are quite confident that these are sufficient to justify a fair and candid trial. We have only to conclude in the words of a man who had seen and tried much, and who had reflected profitably on all things,—*Μη εἰπῆς, τί στυγέω, ὅτι αἱ ἡμέραι αἱ πρότεροι ἦσαν ἀγαθὰ ὡς οὗτοι σῆς; ὅτι οὐκ ἐν σοφίᾳ ἐπηρώτησας περὶ τούτου.* “Say not thou, what is the cause that the former days were better than these; for concerning this thou doest not enquire in wisdom.”

* For some pointed illustrations of the impracticability of suppressing unlicensed practice by penal enactments, derived from the experience of the United States, we refer to the Medical Intelligence.

ART. III.—*The Anatomy of the Arteries of the Human Body, with its applications to Pathology and Operative Surgery, with a Series of Lithographic Drawings, with Practical Commentaries.* By RICHARD QUAIN, Professor of Anatomy in University College, and Surgeon to University College Hospital. The Drawings from Nature and on Stone. By JOSEPH MACLISE, Esq. Surgeon. London, 1844. Parts VIII. to XVII.

IN the Fifty-sixth Volume of this Journal (p. 276) we gave a short account of this work, so far as it had then proceeded, that is, the first seven numbers, and we then took occasion to point out its peculiar merits, and to express a very favourable opinion of the work in general, as most valuable to the anatomist, and, above all, instructive to the surgeon. The opinion thus given was founded on the character of these first seven numbers, and it was accordingly liable to modification or alteration, according to the manner in which it might be applicable to the characters of the subsequent numbers.

The work is now completed by the publication of ten more numbers, making in all seventeen numbers, containing altogether eighty-seven plates, accompanied by 543 pages of explanatory letter-press. In announcing thus the completion of the work, we are happy to say, that the manner in which it is completed, not only confirms the opinion already expressed, but enables us to express that opinion in terms, if possible, stronger and more decided. We look on this work, in short, as one of the best modes hitherto given to the public, of the manner in which the anatomical history and relations of any of the organic systems might be determined.

The views of the different divisions of the arterial system presented in the present work have been taken from about 290 subjects. The facts illustrating the history of the arterial system and all their varieties have been deduced from the comparison of the arteries in 1040 subjects. From these the views have been selected and arranged in the manner most likely to communicate to the anatomical and surgical reader correct ideas of the origin, course, and distribution of the arterial branches in the different regions of the body.

At the time when we gave our first notice of this work, it was believed that the half of the performance was completed, thirty-five plates being at that time before the public, while it was thought that the whole would be comprised in about sixty-five or seventy plates. The work has proved, as occasionally happens, to be ra-

ther more extensive. It now consists of eighty-seven plates, forty-two being given in the course of ten successive numbers.

In these forty-two plates, Mr Quain has illustrated, with great accuracy, the anatomical history of the arteries of the anterior parts of the atlantal or thoracic extremities, those of the whole of the sacral or pelvic extremities, and those of the trunk, not previously noticed, as the arteries of the abdomen, and the various abdominal and pelvic organs.

The nature of this notice, and, we may add, the nature of the work itself, will not allow us to enter into any details. But we may advert, in a general manner, to the objects represented in the engravings, and to the manner in which they are represented, and their peculiarities are described.

In plates 36 and 37 are represented rare deviations of the ulnar artery, peculiarities of the brachial trunk, and deviations in one of the two arteries representing the brachial; then come the arteries of the fore-arm and hand in plates 38, 39, and 40, and the ramifications into which this complicated subject diverges are continued to the 46th plate inclusive.

The difficulties of this subject are well known to practical anatomists; and perhaps no subject in anatomical description has been the cause of so much labour in being reduced to general rules; and in no other division is it so difficult to say what is the constant and regular or normal distribution and what are the deviations and exceptions. Dr Barclay of this city was the first anatomist who attempted to show publicly these difficulties; and, in his work on the arteries, he has attempted to prove the general characters of the course and distribution of the arteries with great labour and research, but often with such an array of conflicting evidence as tends to perplex the mind of the student. His work is, nevertheless, most valuable, and will always be perused by the angiologist and the surgeon with interest and advantage.

Mr Quain mentions, under the head of Varieties in the Position of the Brachial Arteries, the case of the trunk being sometimes found separated by a considerable interval from the biceps muscle, instead of lying along the inner margin of that muscle. Such a position would cause difficulty in finding the artery in the operation of placing a ligature on it for aneurism at the bend of the arm, or wound of the arteries proceeding from the brachial. What is called the high division of the vessel is also noticed as occurring in 64 among 481 cases, or more than one-seventh.

Besides the branches given off by this trunk in its course, the trunk itself is divided into three considerable arteries, the radial, ulnar, and interosseal; and each of these are liable to variations in origin, course, size, and ultimate distribution. One of the most curious facts regarding the radial artery is its supposed or

alleged occasional absence. Mr Quain shows that in certain subjects its size is very small ; and he seems to think that this diminished size may be a sort of transition to the total absence of the vessel. He has not, however, seen any example of the occurrence ; and he cites from Professor Otto of Breslaw, an example in which the descending trunk was entirely wanting ; while the interosseal artery was larger, and gave to the hand the branch which is naturally sent from the radial, (p. 221.) In several instances in the living body we have observed an apparent want of the radial artery, that is, the radial artery not to be felt pulsating in the usual situation along the inner and anterior or volar aspect of the radius. Careful examination, however, showed that though the artery could not be found there, a branch quite as large was found descending along the external aspect of the radius, and passing by the thenar aspect of the wrist and thumb.

Though deviations from the usual course are observed in the large arteries and the principal trunks, yet it is in the smaller divisions of the arterial system that they are most common and multiplied. Thus, variations in the origin, course, and situation of the vessels are more frequently observed in the arteries of the arm than in those issuing from the aorta, more frequently in the radial, ulnar, and interosseous than in the brachial, and much more frequently in the volar and digital arteries than in those of the forearm.

After representing in plates 47 and 48 the thoracic aorta and its arterial offsets, and the whole aorta and its emergent vessels, the engravings from the 49th to the 60th inclusive are devoted to the elucidation of the abdominal and pelvic arteries, and the variations which they undergo.

To the philosophical anatomist it is certainly interesting to contemplate the different modes in which the arterial tubes issue from the aortic trunk, and are subsequently arranged according to the organs to which they are distributed. In the chest a series of vessels issue from each side of the aorta in pairs to supply the intercostal muscles,—organs in some degree connected with the voluntary motions. It is remarkable that, as we pass to the diaphragm, which is much less under the influence of the will than the intercostal muscles, we find an intermediate or transition state, as it were, between the arterial branches of the thoracic and those of the abdominal aorta. Though the phrenic or diaphragmatic arteries often come off in pairs from the aorta, yet in a certain number of cases they arise from that vessel by one single trunk, and in a certain number of cases they come off from the coeliac axis. Among 36 cases in which the origin of these arteries was accurately noted, in 19 the right and left phrenic arteries arose separately one from the other ; that is, they were a pair of arte-

ries; and in 17 cases they arose by one small trunk common to both, of the two arteries were originally an azygous artery. It appears, further, that when both arose from the single azygous trunk, that trunk was most frequently a branch of the aorta, (12 in 36,) the celiac artery next one (5 in 36) in frequency, then from the coronary of the stomach, and occasionally from the superior mesenteric artery. It happens, also, that while one phrenic artery is given off by the aorta, the other is given off by the celiac artery. This occurred in 6 cases.

In all this we observe the disposition, if we may so speak, in the artery to associate itself with vessels supplying the organs of organic life; and forming as it were the intermediate point between the intercostal pairs in the chest, and the azygous arteries issuing from the front of the aorta to supply the abdominal organs.

In one case it was also observed that the phrenic artery arose from the posterior aspect of the aorta; and in one case a third phrenic artery was observed.

The celiac artery, the superior mesenteric, and the inferior mesenteric arteries are all azygous or single trunks issuing from the aorta along its anterior aspect. They supply organs devoted to involuntary functions, or forming part of the organic life. These are closely surrounded by the branches of the great sympathetic nerve.

Some useful information is communicated on the venous system of the thorax and abdomen.

The plates from the 61st to the 66th inclusive are devoted to the exposition and demonstration of the arteries of the perinæum and the neck of the bladder,—a very important set of vessels for the surgeon in the operation of lithotomy. These he must divide in cutting into the bladder; but it is fortunate that from none of them can dangerous hæmorrhage take place, except the internal pudic and the vesico-prostatic arteries; and even from the former, when divided, the bleeding may be restrained; from the latter the bleeding is sometimes difficult to be stopped.

In the three ensuing plates the relations of the epigastric and obturator in cases of hernia are exhibited and explained.

In the eighteen following plates are exhibited and explained the arterial branches of the lower extremities. These explanations are accompanied with remarks on the surgical operations performed on the arteries, and the effects of ligature in changing and enlarging the collateral branches. Into these details it is unnecessary to enter.

We have only to add, that we admire much the enterprise, the talent, and the persevering industry which have enabled the author to complete this great work. The English surgeon now possesses a work to which he may at all times safely refer for information on

the peculiarities of the arterial system. It will not, indeed, teach angiology to those who have not studied it by personal dissection. But to those who have already studied the subject as they ought to do,—by dissection and by examining preparations, it will furnish most valuable assistance in maintaining their knowledge of angiology in a state of satisfactory integrity and correctness.

Of the pictorial merits of this performance we have already spoken. These, indeed, are very great. They show that it is quite possible for British artists to equal, if not surpass, their continental brethren in the art of lithographic engraving. In conclusion, the work is most honourable to British science and British art.

ART. IV.—*Principles of Forensic Medicine.* By WILLIAM A. GUY, M. B. Cantab., Fellow of the Royal College of Physicians, Professor of Forensic Medicine, King's College, London, &c. &c. Part III. Pp. 391–568. London, 1844.

IN our Sixty-second Volume, p. 255, we mentioned that two parts of this work had appeared. The present is the third, and now concludes the work; and it is therefore proper that we should, according to promise then made, say a few words on the general character of the whole performance. In so doing, the present must be regarded as supplementary to our former notice.

The present portion of the work is devoted to toxicology solely, and of this it gives a very fair view of the present state of knowledge.

This subject is so extensive and complicated, and the occurrence of new facts is daily adding so much to it, that it is by no means easy to give in any work on medical jurisprudence or forensic medicine a review sufficiently ample and minute to be instructive; and, we believe, the only mode of doing the subject justice, is to consider it apart, or by itself, as is the case in the valuable work of Dr Christison. It is, nevertheless, proper to say, that the present author has succeeded very well in giving an instructive account of the different agents used either accidentally or intentionally as poisons, of their characteristic effects, and the most appropriate treatment. With this view he has been at great pains to collect, from every available source, all the new and recent information; and thus he has rendered his work, in this respect, a very useful guide to the student.

The present portion of the work is divided into eighteen chapters, in which, after a preliminary chapter on poisons in general, Dr Guy treats successively of, I. Irritant Poisons, embracing the

concentrated acids and the alkalis, the metallic irritants, irritants from the vegetable kingdom, irritants from the animal kingdom, and irritant gases; II. Narcotic Poisons, including opium, hydrocyanic acid, and the narcotic gases; and, lastly, III. the Narcotic Acrids, including such articles as belladonna, stramonium, hemlock, nux vomica, camphor, alcohol, and the poisonous mushrooms.

In conclusion, now that this work is completed, we must regard it as a performance creditable to the author, and highly useful to the student of forensic medicine.

ART. V.—*Traité du Ramollissement du Cerveau*. Par MAX. DURAND-FARDEL, Docteur en Médecine de la Faculté de Paris, &c. &c. Ouvrage couronné par l'Académie Royale de Médecine. Paris, 1843. Pp. 526.—*Treatise on Softening of the Brain*. By MAX. DURAND-FARDEL, Doctor of Medicine of the Faculty of Paris, Honorary Member and former Vice-President of the Anatomical Society, &c. &c.

SINCE the publication of the work of M. Rostan in 1820, our knowledge of the diseases of the brain, but especially of those attended with softening of its substance, has made considerable progress. For this we are chiefly indebted to the writings of Lallemand, Bouillaud, Andral, Dellaberge, Monneret, Raikem, Rochoux, Gendrin, Cruveilhier, Calmeil, Schedel, Foville, Dechambre, Copland, Bright, Abercrombie, Craigie, and Carswell. Even the most talented of these writers, however, left much important matter still untouched, and this not more from the inherent difficulties attending the inquiry, than from the difficulty of drawing conclusions applicable to all cases, from the limited number of cases which could come under the personal notice of one individual. When a number of detached facts have been published on any particular disease by different individuals, perhaps one of the most important services which one can render to the profession is to collect and classify these facts, and endeavour to show what practical conclusions can be drawn from them. This can only be done after the facts have attained a certain bulk, seeing that in the narration of cases it is always found that so many important symptoms are passed over, that many have to be rejected for want of the data requisite to their proper classification. M. Durand-Fardel has not only enriched the annals of medicine with many instructive cases observed by himself, but has collected from different writers all those cases which, from the minuteness of detail,

furnish those characters requisite for their distinct classification. In this manner he has adduced in his work, or refers to, the history of most of the recorded cases in which softening of the cerebral substance has occurred.

The work is divided into three parts; the *first* treating of acute softening; the *second* of chronic softening; and the *third* of the treatment, cause of death, prognosis, nature, etiology, and causes of softening. An appendix is added, in which softening of the brain of infants is shortly alluded to.

Softening of the brain is, according to M. Durand-Fardel, a disease which is as marked in its symptoms as almost any other malady of the brain with which we are acquainted; marked by its symptoms during life, marked by its pathological changes seen after death. In the greater number of cases the softening terminates fatally during the acute stage; at other times it passes over the acute stage and becomes chronic; in a few cases, however, it is chronic from the very first. There are no marked changes in the symptoms by which the acute stage can be distinguished from the chronic; the one passes into the other by such insensible gradations that M. Durand-Fardel was at last induced to consider every case as acute which terminated by the 25th or 30th day,—every one as chronic which exceeded that period in its duration.

The first chapter is devoted to the pathological anatomy of acute softening of the brain, a disease specially characterized by redness and diminution of consistence, without disorganization of the cerebral pulp. Though acute softening is observed at all parts of the brain, it occurs in no part so frequently as the convolutions. In 33 cases of this disease which came under the personal notice of M. Durand-Fardel, the convolutions were affected in 31. In 9 of these cases the gray matter of the surface was alone softened; in 22 the subjacent white substance participated to a notable extent in the morbid change; in 4 cases the *corpora striata*, and in 3 the optic thalami were also softened. In one case the medullary substance was alone softened, and in one the surface of the cerebellum. The same results were arrived at from comparing the histories of 53 cases narrated by Rostan, Andral, Raikem, Lallemand, &c. From these it appeared that the convolutions and subjacent white substance were softened in 22 cases; the convolutions alone in 6 cases; the white substance alone in 5; the *corpora striata* alone in 11; the *corpora striata* and optic thalami together in 6; the optic thalami alone in 4; the *tuber annulare* in 3; while the peduncle of the brain, the *corpus callosum*, the septum, the fornix, and the cerebellum, were severally affected only once. It is interesting to remark that softening, by preference, attacks the convolutions of the brain; whereas hæmorrhagic effusions are rarely found there, but generally in the vicinity of the

ventricles. There is therefore no analogy in the two diseases, as some have supposed. The space occupied by the softening is very variable. In one case M. Durand-Fardel saw it extend over the whole surface of the two hemispheres, and the walls of the ventricles; in rare cases it occupies the whole thickness of the hemisphere; but in general it is more circumscribed, being often not larger than the size of a bean or walnut.

The consistence of the softened part varies from that of a firm jelly to that of thin pap. M. Durand-Fardel lays down the rules by which he determines whether a part be simply softened or disorganized. He terms that disorganized which has lost its natural structure, when the nervous matter is broken down or is replaced by adventitious structures. He does not regard a simple sanguineous infiltration as disorganization, though, of course, it may lead to it. The best way of ascertaining whether the brain is really softened, and the extent of the softening, is by subjecting the slices of brain to a gentle and slender stream of water. If the softening is recent the nervous matter is rarely washed away; but in chronic cases the softened portions break off and are carried away by the stream of water. In general a healthy brain is not injured by pouring over its slices a stream of water. In many cases, however, it is extremely difficult to determine whether a brain be really softened, seeing that the disease of which the patient died, the state of the fluids, the period which has elapsed before the brain be examined, and the heat of the season powerfully modify the consistence even of a healthy brain.

Softening of the brain is usually characterized by a change in colour. This may either be red or yellow: the red being the first effect of the morbid process; the yellow that attending a more advanced stage of the same disease. The red coloration depends on three causes, which may exist together or separately. *1st*, Injection of the blood-vessels. In some cases this injection is more apparent at the circumference of the softened part than in the diseased portion. *2d*, Sanguineous infiltration. In almost every case of softening of the gray substance, if the vessels are found injected, blood is also found infiltrated through the softened tissue. This is generally owing to the rupture of the vessels. Small effusions of blood are occasionally found scattered through the tissue, from the size of a millet-seed to that of a pea. This generally characterises the amaranth-red softening. *3d*, Besides the sanguineous infiltration, an uniform red coloration of the softened parts is occasionally observed. The colour varies, from a pale rose pink to a moderately intense red. This form appears to depend on an imbibition of the colouring matter of the blood, rather than to an infiltration, and the blood-vessels appear to be sound. In some cases the vessels may be seen hold-

ing a short transverse direction through the gray to the medullary substance, each surrounded by a coloured circle, evidently due to this cause. This red coloration is always most marked in the gray substance of the brain. In the medullary substance it usually exists only as a mottling.

According to Lallemand, the yellow coloration of the brain is caused by the presence of purulent infiltration. This, of course, modifies all his views, and makes him regard suppuration as one of the constant consequences of encephalitis. Before proceeding to show that this is not the cause of the yellow colour of the softened brain, M. Durand-Fardel takes a rapid glance at other organs, and shows that effusions of blood or ecchymosis are very generally attended with a yellow coloration during their subsequent absorption. This phenomena, he shows, attends similar effusions in all organs; nay, he has even seen it produced in the white substance of the brain, by the transudation of blood through the unruptured coats of the blood-vessels. The yellow colour of brain is owing, in every case, to the effusion of blood, but is rarely well marked in the gray substance, in consequence of the red and injected state of the vessels. In acute softening, the yellow colour is more generally due to transudation of blood through the overloaded capillaries, than to actual effusion, unless it has been brought on by injury causing effusion, when it is often very marked, even on the sixth day from the accident. The gray and green colours rarely, if ever, attend cases of acute softening; they seem to be peculiar to the chronic stages.

When acute softening affects the surface of the brain, it is generally attended with tumefaction of the part, due, in general, to an increase in the thickness of the gray cortical layer. This tumefaction affords a valuable diagnostic mark of the stage of disease, seeing that, in the chronic stage, the brain retreats, or is more or less atrophied. This tumefaction causes the convolutions to press against one another, and appear flattened or deformed. No conclusions can be drawn from the relative thickness of the cortical layer of brain. It varies not only in different convolutions, but greatly in different persons.

Acute softening of the brain is, generally speaking, a local and circumscribed affection. Sometimes adjoining parts are injected, occasionally the whole brain; but these are the exceptional cases. The membranes, in a few cases, present peculiar appearances. When the tumefaction of convolutions is great, the arachnoid membrane over them is often dry and viscous, a state also observed on corresponding parts of the *pia mater*. This appearance is entirely attributable to the tumefaction and pressure exerted on these membranes by the brain. Injection of the larger vessels of the *pia mater* is so often produced by *post mortem* causes, that

no conclusions can be drawn from their state; but if the minute subarachnoid vessels are minutely injected, it is alone attributable to an active congestion occurring during life. Of 25 cases of cerebral softening, this active injection was slight in 5 cases, considerable in 4, limited to the affected hemisphere in 1, and only over the affected spot in 1. Andral's cases presented nearly the same results. In 8 of 13 cases the vessels of the *pia mater* were natural. In the other 5 they were more or less injected.

It is a much more difficult task to ascertain whether effused serum be the result of a morbid process or no. M. Durand-Fardel has ascertained that in the aged the brain shrivels, retires from the skull, and in the space thus left serous fluid is effused. This, therefore, is natural to the aged. In them the convolutions have a shrivelled appearance, and are separated from each other, even to the bottom of the convolutions. Whenever this appearance, therefore, is remarked in any brain, we may be assured the effusion is of old date, and has been effused to fill the place of the shrivelled convolutions. If, however, the convolutions are full and press against each other, or are flattened and depressed by the serous effusion, we may be certain the effusion is recent. M. Durand-Fardel has, however, only met with one case in which subarachnoid effusion had attended the acute stage of softening; in all the others neither serum nor purulent matter were met with. In the 33 cases of the same disease recorded by M. Andral, effusion was only once met with. From this it is concluded that, contrary to the opinion of M. Lallemand, the membranes of the brain have little or nothing to do with the changes connected with acute softening.

In a few cases the *pia mater* adheres to the softened part of the brain, so that its removal raises a portion of the softened brain. In some cases this seems to be caused by the natural attachments of the *pia mater* proving too strong for the softened part to resist; in other cases it seems to be caused by a true morbid adhesion of the membrane to the brain.

The remainder of this chapter (Art. 2) contains an account of the cases of acute softening arranged in two series; the first showing the morbid changes attending the acute softening of the cerebral substance, the other that of the gray substance. The cases are so detailed as to exhibit the pathological changes in an ascending series—from the simple injection of the one and the rose tint of the other substance, to those extensive softenings where the cerebral substance, combined or not with effused blood, is seen changing more and more to those appearances which characterize the chronic stage.

The second chapter is devoted to a lengthened discussion on the three essential morbid states attending acute softening of the

brain, viz. congestion, sanguineous infiltration, and inflammation; and the author endeavours to show the part which each of these performs in giving rise to that morbid state. It is shown that congestion may exist without softening, though, if it continue, it ends in inflammation and softening of the cerebral substance. Next follows a detail of cases in which infiltration of blood occurred in various forms, as in scattered points varying from the size of a millet seed to that of a walnut, or in plates separating the outer cortical cerebral layer, which were yet unattended with softening. Under the third head he proves that the softening of the cerebral substance is always due to inflammatory action, though often or always preceded by congestion or infiltration of blood.

The symptoms of acute softening form the subject of the third chapter. These, from their variety, cannot be referred to any general type, but may be ranged in two groups; the first exhibiting the characters of diminution or abolition of the cerebral functions; the other perversion or excitation of the same functions; that is, the first group exhibiting the symptoms of cerebral apoplexy, the last those of meningitis. It may be recollected that M. Lallemand and others have endeavoured to show that these two classes of symptoms follow one another, being but successive stages of the same morbid process; the state of excitation marking the affection of the membranes, that of abolition of the cerebral functions marking the affection of the cerebral substance. M. Durand-Fardel combats this view, and, by a reference to many instructive cases which he details, proves that each of these stages may characterize the attack from the very beginning. The first series of cases is in particular very interesting, as showing that acute softening may come on and run its course as suddenly as cerebral apoplexy itself, and be attended with very nearly the exact same symptoms.

The second part of this chapter contains a detailed account of the symptoms attending acute softening of the brain, and in this he differs somewhat from Rostan, Lallemand, and Andral, chiefly, as he states, from his recognising an acute and chronic form of the disease—a distinction not made by these authors.

Acute softening is often, but not always, attended with the same kind of premonitory symptoms which precede cerebral apoplexy, as numbness or weakness, cramps, ringing in the ears, &c. General or partial impairment of the intellects, with diminution of the powers of sensation and of motion, are the first symptoms which are remarked in acute softening. These phenomena lead, either gradually or by a sudden transition, to complete abolition of all the faculties of body and mind. In the first case, the impairment of the intellects and the powers of sensation and of voluntary motion gradually increase in severity. In the other case,

what is called an apoplectic attack comes suddenly on and prostrates the patient. In certain cases the malady begins by exhibiting certain phenomena of excitation and spasmodic symptoms, as epileptic fits. In other cases, without premonitory symptoms of any consequence, a sudden apoplectic attack begins the disease. In 24 cases of acute softening, described by M. Durand-Fardel, 17 exhibited the apoplectic form; and, of that number, 12 were seized suddenly without previous premonitory symptoms. M. Rostan's observations give the same result, as well as those of several other writers. The author has collected accounts of 137 cases of acute softening; and it appears that in 79 of these the malady made its appearance in the apoplectic form, by the sudden loss of consciousness and of the power of motion; while, in the remaining 58, it followed a different course. This shows that acute softening affects an apoplectic form in the greater number of cases—a fact for which the author accounts by stating that the disease is more common in individuals above than below sixty years of age.

Paralysis, limited to one side of the body or to one member, is almost always remarked in acute softening of the brain. It is also occasionally attended with rigidity or contraction of the affected member. The rigidity sometimes affects the unparalyzed limb. Convulsions, either general and resembling the epileptic paroxysm, or partial, resembling the tetanic spasms, or simple muscular tremors are often present. All these may affect the palsied side or the sound one, and may precede, alternate with, or follow the paralytic seizure. The loss of the power of motion constantly keeps pace with the loss of the intellects. When the disease begins with a sudden loss of consciousness, the paralysis is generally sudden and complete, or nearly so. In every case the diseased portion of the brain was on the opposite side of the body from that of the paralyzed limb.

It is extremely difficult to discover how far the sensibility is affected in diseases of the brain. It often happens that signs of sensation successively appear and disappear in the same spot, so that the sensibility of the skin appears natural at one time, and lost at another. In a few rare cases the sensibility of the skin is exalted, and acute pains are complained of in the interior of the limbs; but these symptoms are most frequently remarked in chronic softening of the brain. Numbness, formications, sensations resembling those produced by compressing a nerve, pricking sensations, &c. in the face and limbs, but rarely in the trunk, very commonly precede and attend the invasion of acute softening; and the author states as the result of his experience, that, if marked numbness and formication be experienced on one side of the body or in one limb, in almost every case it is softening which follows. This is most marked in those cases where the malady

makes its invasion slowly. When it attacks like an apoplectic seizure there are rarely any such premonitory symptoms.

Headach rarely attends acute softening, being only noticed in 7 out of 32 cases seen by the author, and in 18 out of 67 recorded by others. When it does occur it is not in general of a violent description; and is generally confined to the forehead or summit of the head. The author thinks that previous writers have laid too much stress on the occurrence of headach in softening, certainly far more than it merits, seeing it is wanting in most cases, and, even when present, affords no special indications either of the nature or seat of the disease. A persistent pain of the head, limited to one spot, may, however, afford a valuable indication of the threatening or existence of softening.

Disorder of the intellects is one of the most interesting phenomena of acute softening. Shortly after the invasion of the malady, confusion of ideas, sadness, or, on the other hand, irascibility are remarked. When the disease goes on slowly the mental faculties become more and more obtuse, till they end in idiocy or true coma. In other cases there is exaltation of the ideas, loquacity, quiet delirium, and, especially in old people, delirium of action, that is, the person dresses and undresses many times without being aware of doing anything wrong, mistakes his bed, &c. This state generally ends in idiocy and coma. In other cases the coma comes on suddenly, and is seen in its most perfect form from the very beginning. Even when the person is lying in a comatose state, in a few rare cases, it happens that the intellects remain so entire that he endeavours to execute the movements we wish him. In other cases the intellects remain entire, notwithstanding the loss of the power of speech and of voluntary motion. Delirium is occasionally the only symptom of softening, in which case there is incessant talking, sleeplessness, and often hallucinations. Five such cases are recorded.

The state of the countenance affords a valuable indication of the threatening or actual commencement of acute softening. Sometimes there is an astonished look, or one of stupor, of indifference, or of idiocy. These states are more peculiarly remarked in the aged. In those in the prime of life the countenance often expresses irascibility, and a quick sharpness. The most important change, however, is a commencing paralysis of some part of the countenance, as one eye-brow more elevated than the other, the mouth slightly drawn to one side, a commencing loss of power over one eyelid, as if it were too heavy to be completely raised. When these are present "we may almost predict with certainty that softening is threatening, or has already commenced." This partial loss of power over the muscles of the face may be concomitant with the dull, stupid look; but even though this last be

wanting, the partial affection of the muscles is equally valuable as a diagnostic symptom of softening. The eyes are sometimes brilliant and staring; at other times dull and without expression. Strabismus is occasionally present. Redness of the face is often present, indicative of sanguineous congestion of the head. A very remarkable and striking symptom, which is very frequently remarked in cases of acute softening, is an increased secretion from the follicles of the mouth and of the eye. This is especially remarked with old people, in whom this viscid secretion dries, and forms hard masses on the edge of the eyelids, which irritate the eyes; while an abundant glairy fluid constantly drops from the mouth, or, when more viscid, adheres to the tongue and palate, forming a thick yellowish crust, which is reproduced as soon as removed. A remarkable fact connected with these increased secretions is that, if a partial amendment takes place, the discharge of itself ceases; to reappear as soon as the malady again progresses.

The speech is almost always more or less affected in acute softening. When the symptoms are gradually developed, slight embarrassment of speech is first perceived, increasing daily. When the disease comes on like an apoplectic seizure, the faculty of speech is lost at once.

The senses are not in general much affected unless in the case where there is a complete loss of consciousness. Deafness is rarely present. The sight is only in few cases lost, and then only on the paralyzed side. The pupil is frequently immoveable, but the vision retained. M. Lallemand holds the state of the pupil to be diagnostic of softening, being, as he says, always contracted during the first stage; whereas in cerebral apoplexy it is dilated. M. Durand-Fardel has not arrived at the same conclusions. In 17 cases where the state of the pupil was noted, it was normal in 3, more or less contracted in 5, more or less dilated in 6, dilated on the non-paralyzed side in 2, contracted on the sound side and dilated on the paralyzed side in 1. In none of the cases in which the pupils were contracted was rigidity of the limbs noticed, though M. Lallemand states this to be a common symptom. In M. Rostan's cases of acute softening the pupils are only noted in one case as being contracted, and in this case no rigidity of the members was observed. In almost all the rest the pupils were dilated. In the only three cases of M. Andral in which the state of the pupils is noticed, they were dilated in two cases, and rigidity and convulsions occurred in these cases; while in one in which they were contracted no rigidity was remarked.

The pulse is not in general materially affected in acute softening until it has gone on so long as to affect the respiration. Respiration is scarcely ever primarily affected, nor until symptoms of considerable compression of the brain are manifested, when it

becomes hurried, noisy, and stertorous. Even in cases of hemiplegia from softening the movements of the chest seem regular on both sides. Towards the termination of the disease the respiration is always notably affected, so much so indeed that death seems in most cases to result from embarrassment of that function.

Deglutition is often difficult from the stiffness of the jaws and the state of coma; it is always so in the later stages of the disease. Vomiting is occasionally present at the invasion of the disease; but this seems more attributable to the peculiar state of the patient's stomach than to any special connection with softening. The stools and urine are generally voided unconsciously from the moment of the attack. When the softening comes on gradually this symptom is only remarked during the more advanced stages, and as the urine accumulates in the bladder it requires to be frequently drawn off. There is always constipation in softening. Eschars which form on the back of the sacrum and other points pressed on often hasten the fatal termination.

Acute softening is a disease which runs its course rapidly. Of 17 cases where the exact duration was ascertained personally by M. Durand-Fardel, 2 terminated by death in 24 hours; 7 in 2 days; 9 in 5 days; 7 between the 5th and 10th days; 1 on the 20th; and 1 on the 30th day. M. Rostan's and M. Andral's cases give a nearly similar result.

The fourth chapter contains a number of valuable remarks on the appreciation of the different symptoms of acute softening of the brain. He shows that cerebral congestion is the first in the train of morbid symptoms, and, according to its intensity, produces symptoms either of oppression or excitement of the cerebral functions; and that the symptoms which this congestion produces are the very same as those which mark the incipient stage of softening, and cannot therefore be distinguished from it. Several interesting cases of cerebral congestion are related, some of which proved fatal at that stage, and allowed the fact to be ascertained on dissection; others recovered speedily under depletive treatment. In the second part of this chapter the author shows that the symptoms common to inflammatory affections of the brain are also those of acute softening, and several cases are shortly narrated to show this fact.

The diagnosis of acute softening forms the subject of the fifth chapter. The most characteristic form of acute softening, that in which the paralysis, &c. slowly increases, may sometimes, but not always, be distinguished from congestion by the paralysis being confined to one limb or one side of the body. From cerebral hæmorrhage it may be distinguished by its gradual approach. Hæmorrhage of the arachnoid membrane occasionally presents symptoms so completely similar that it cannot be distinguished from softening. But this is not its usual form.

The diagnosis is still more difficult in that form of acute softening which comes on suddenly, like an apoplectic attack. After a long discussion, the author arrives at the conclusion, that a sudden attack of acute softening and one of cerebral hæmorrhage are so identical in symptoms that the one can scarcely be distinguished from the other. Consciousness returning after the apoplectic seizure, though the paralysis remains complete, and some occasional motions being noticed in the paralyzed limbs, afford a presumption in favour of its being softening. It has been stated by some writers, that in softening the cutaneous sensibility remains tolerably entire, whereas in cerebral hæmorrhage it was extinguished. But the author proves, by a reference to a large collection of published cases, that in both these diseases the one-half of the cases exhibit no cutaneous sensibility; the other half exhibit it in a more or less normal state. Most writers on softening of the brain regard the occurrence of contractions of the limbs a sure diagnostic mark of softening in contradistinction to cerebral hæmorrhage, in which, they assert, the limbs are always flaccid. The author answers this by mentioning that, in 47 cases of acute softening observed by M. Rostan, Andral, and himself, contractions were observed in only 18 cases, or about a fourth only; whereas in 29 cases of cerebral apoplexy seen by himself contractions occurred in 19 cases, or in two-thirds. He states, however, that as contractions are supposed to be excited only by the hæmorrhagic effusion being within the ventricles, and so great as to exert considerable pressure on the brain, that the case may be diagnosed to be one of softening, if the apoplectic symptoms are slight and yet contractions of the limbs are apparent. In this case the presence of the contractions precludes the idea of the hæmorrhage being limited to the superficies of the hemisphere, and the slight intensity of the paralysis that of its being ventricular hæmorrhage. The only conclusion, therefore, is, that it must be a case of softening. When, on the other hand, symptoms indicating a serious compression of the brain are not attended by those of contraction, it may be concluded that the case is one of softening; for in this case the absence of contractions prevents us from supposing it to be a case of ventricular hæmorrhage, while the intensity of the symptoms lead us to infer the hæmorrhage cannot be of a very circumscribed character. The author states, that by attention to these few diagnostic signs, he has been able on several occasions to predict this form of acute softening.

The ataxic form of acute softening, characterized by delirium alone, may be mistaken for meningitis. This form may, however, in general, be distinguished from that complaint. This form of softening is almost peculiar to the aged, in whom meningitis scarcely ever occurs. When paralysis comes on from meningitis,

it is general. In softening, the paralysis is limited to one half of the body, or to one limb only. Besides, the headach, intolerance of light, convulsive movements, &c. are much more severe in meningitis than in softening.

The second part of M. Durand-Fardel's work is taken up with the consideration of chronic softening of the brain. The first chapter treats of the pathological anatomy of that state. Chronic softening of the brain presents itself under three distinct stages. The first period, which may be termed pulpy softening, only differs from acute softening in the want of redness, and consists, like it, in a simple diminution of the consistence of the nervous structure. It is to this form that almost all the cases of softening of the brain described by authors belong. To this stage succeed varied and different forms of disorganization of texture, which have hitherto almost completely escaped the attention of pathologists.

The second period assumes two different forms, according as the disease attacks the cortical layer of the convolutions or the other parts of the brain, whether white or gray. In the first form, on the surface of the convolutions, plates of a yellow tissue form, of variable thickness, in texture resembling a membrane, and superior in density to the healthy cortical substance. Though very soft to the touch, it often resists a jet of water, or pressure with the finger, or traction, more than healthy cortical substance. This appearance may be styled the yellow plates of the convolutions. In the second form, the disease occurring in the deeper seated parts, a kind of absorption of the nervous pulp occurs, and its place seems to be taken by a more or less dense cellular tissue, the meshes of which are infiltrated with, or form cavities containing a turbid whitish fluid, the milk of chalk of Chaussier. This form of softening may be named the cellular infiltration.

The third period is characterized by the disappearance of the softened or disorganized pulp, and by a loss of substance. This is the last stage of the malady, and might be termed the ulcerative period, seeing that it appears to be by a somewhat similar process that the ulcerative cavities are found on the surface of the brain and in its interior.

Induration of the softened cerebral pulp is scarcely ever observed but as an attendant of lesions of the bones of the skull, or from direct injury.

Though the distinctive mark of chronic softening of the brain be the want of redness, yet traces of its former existence are left in the almost constant yellow coloration of the gray substance, and in the occasional yellow coloration of the white. It is remarked, as one of the peculiarities of chronic softening, that the malady may become arrested at any stage, and the person recover

for an indefinite time, the part undergoing a kind of cure like that remarked in cases of cerebral sanguineous effusions.

In treating at length, under three distinct heads, of these different forms of chronic softening, the author notices the microscopic observations of Gluge. From these observations it resulted that softening of the brain, with white coloration, generally presented the effusion of pus globules; that softening, with red coloration, but without effusion of blood, exhibited the effusion of compound (fibrinous) globules, the products of the first degrees of inflammation; and that softening, with sanguineous infiltration, presented the compound globules, or pus globules, along with the blood globules. M. Durand-Fardel having also used the microscope, dissents from M. Gluge's conclusions, seeing that in eight cases of chronic softening with white coloration, he met with infiltration of pus in only two instances.

The first form, or pulpy softening, is rarely seen to involve the cortical layers of the brain, seeing that it generally passes through its stages more rapidly than the deeper seated parts, and is found to have assumed the form of the yellow plates which form one of the varieties of his second form of chronic softening. The pulpy softening varies in its extent, occupying from a very small portion to nearly the whole brain.

The conversion of the cortical layer of the brain into yellow plates is one of the second stages of chronic softening. It is remarked as a very curious change, and one which demonstrates that the cortical layer of gray matter possesses some anatomical peculiarities of structure which cause it to differ from the gray matter below it, which, in its morbid changes, follows the same order as the white cerebral substance. The researches of anatomists, so far as known to the author, have thrown no light on this subject, but we here may refer to a paper in the present Number, "On the Brain, Spinal Chord, and Ganglia," which seems to explain the peculiarity. Dr Stark there demonstrates that the cortical or outer layer of gray matter contains no tubes of white matter, or only a microscopic layer on its very surface; whereas the layers of gray matter below, besides being separated from each other by transverse layers of white cerebral substance, contain the radiated expansions of the white central matter, and thus in a great measure consist of tubes of white cerebral substance. This difference in structure would account for the difference in the pathological changes of these parts, and for the layer of gray matter which is next the central white matter undergoing pathological changes analogous to it, but different from that of the cortical layer.

The author seems to imagine that no one has observed this change of the cortical layer but Cruveilhier, Bravais, and himself;

but so long ago as 1827, Dr Bright described very particularly, and gave several splendid coloured representations of this form of chronic softening in his "Reports of Medical Cases." In this form the cortical diseased spots become very tough, so that they may even be pinched off with the fingers; they may be considerably stretched without tearing, and are with difficulty cut with a blunt knife. No distinct fibres can be recognised in these spots, nor blood-vessels. They occasionally adhere to the *pia mater*, and are often surrounded by softened spots, or even ulcerations, extending through the gray matter. The medullary matter below these spots is almost always more or less softened, but more frequently converted into that which the author terms the cellular infiltration. Three cases of this form are alone described.

The cellular infiltration which forms the other variety of the second stage of chronic softening occupies the internal parts of the brain, and never the cortical layer. The parts chiefly affected are the white substance of the hemispheres and the *corpora striata*, and the diseased portion may occupy a space from the size of a nut to that of the whole hemisphere. The author thinks that the cellular tissue which constitutes this alteration is nothing else than the cellular substance of the nervous matter, exposed by the complete disappearance of the nervous pulp. The filaments of cellular tissue stretch in every direction, forming a kind of meshes or cells, in which is contained a peculiar turbid whitish fluid, compared to butter-milk, or chalk and water. It is quite unlike pus, and wants both its colour and unctuous feel. When this fluid is allowed to stand at rest in a glass it deposits a quantity of small bodies like particles of chalk. The author finds that a fluid quite similar in every respect to this is produced by beating the white cerebral pulp with water; he consequently regards the change as consisting simply of a kind of fusion or liquefaction of the cerebral pulp. The name which the author has selected for this variety of softening appears to be a very unfortunate one, as to most minds it would suggest a very different pathological change from that to which he applies it. The milky or milk-like softening would have been a much more appropriate term. The brain around these fluid parts is found softened, yellowish, and more or less vascular; and, when it stretches up to the gray cortical layer, this is found to have become converted into the yellow plates above described. The author narrates seven cases of this form of softening, besides quoting from the works of others cases which seem referrible to this particular form.

The concluding part of this second division of the chapter is taken up with a very interesting inquiry, proving that this form of chronic softening has been often mistaken for an old hæmorrhagic cavity.

The author points out the diagnostic mark of this form of softening to consist in the presence of the transverse interlacing cellular filaments; whereas in an old hæmorrhagic cavity the walls are smooth, or not connected by bridles of filamentous tissue, and, if examined within the year after the effusion has taken place, generally contains very evident remains of the clot.

The third part of this chapter contains the account of the third period of chronic softening,—that of disappearance of the softened tissue. If we follow the progressive stages of softening we shall see that there is a tendency to atrophy or disappearance of the softened tissue as the disease advances. In the acute stage, as in all other inflammations, there is an increased determination of fluids to the part, and tumefaction; but this soon disappears; the pulpy softening forms; the brain returns to its usual volume; then the convolutions shrivel, become flattened; the cortical layer is converted into yellow plates; and the milky softened cerebral mass becomes absorbed; or the diseased portion may be removed by a kind of ulcerative absorption.

To exhibit the different stages of this last period of chronic softening, the author first narrates the history and pathological appearances in those cases which, from being associated with those of the preceding period, prove them to be dependent on the same causes; and afterwards passes to those cases where, from the disease being further advanced, these ulcerative appearances are found by themselves.

The first series of cases exhibits ulcerations of the convolutions, the edges of the ulceration still consisting of the yellow plates described under the second form of chronic softening, with and without the cellular infiltration of the deeper seated parts of the brain or cerebellum. The second series of cases includes those in which the cerebral substance was absorbed, in several of which the cortical layer of some of the convolutions was converted into yellow plates. In some cases nearly a whole lobe of the brain was destroyed; in others the right or left *corpus striatum*. In a few cases both the lobes of the brain and the corresponding *corpus striatum* were simultaneously more or less destroyed.

The fourth section of this chapter contains the numerical statements of the seat of chronic softening. Without going into particulars, it may be stated that, in the 67 cases seen by the author, the convolutions were affected in 45 instances, and the *corpora striata* and optic thalami in 22. If the whole cases of softening of the brain, both acute and chronic, seen by the author, or collected from the works of others, be reviewed in the same way, we find that of 181 cases, 89 were acute softening, and in 59 of these the softening was seated in the convolutions, and in 30 in the *corpora striata* or optic thalami; 88 were chronic cases, and

in 60 of these the softening had its seat in the convolutions, in 28 in the *corpora striata* or optic thalami. In other words, softening of the brain occurs twice as often in the convolutions as in the *corpora striata* or optic thalami. We may remark in passing that the author's numerical statements are extremely confused, and contradict each other in the most strange manner. Thus 86 in one table is quoted as 89 in another; while 95 in one table is reduced to 88 in another. Not having the cases before us in detail, we are unable to correct the author's results. The author's object in laying stress on the relative frequency of the malady in these different parts of the brain is to contrast it with the seat of cerebral hæmorrhage, and thus prove that the one disease is quite distinct from the other,—cerebral hæmorrhage in almost every instance being confined to the *corpora striata* or optic lobes.

The seventh chapter contains the detailed account of symptoms attendant on chronic softening of the brain. After some general remarks, the author endeavours to show that the pathological states of the brain do not prove the truth of the phrenological doctrines, and that it appears very difficult to deduce from them any certain conclusions as to the special seats of sensation or of movement. The several symptoms are then gone over individually in detail, when he mentions, that, in its progress, the disease assumes four distinct varieties; 1st, declaring itself by its special symptoms from the beginning and progressing slowly, or by successive paroxysms to its termination. 2d, By suddenly appearing like a cerebral hæmorrhagic attack, and following a somewhat similar course. 3d, By gradually making its appearance, but by no well characterized symptom, then all at once ending by a sudden attack which rapidly terminates life. 4th, Declaring itself by no determinate symptom whatever, and never being discovered till after death by some other disease.

The first four begin by headach, giddiness, and occasional loss of memory, which may extend from months to even years. Gradually numbness of the limbs and fingers, formication and increased headach come on, succeeded by weakness of the limbs, trailing of the legs in walking, difficulty of regulating the movements, contraction of the limbs or fingers. These symptoms are followed by paralysis of the face and corresponding side of the body, dull stupid look, half-closed eye without the power to shut it completely, which circumstance often causes it to inflame, embarrassment in the speech, and a peculiar monotonous mode of drawing out the words. The intellects fade with the increasing paralysis, and complete idiotism, with the involuntary passage of fæces and urine often, indeed generally, precede dissolution. Several cases of this first form are narrated, to show the various

modes in which these varied symptoms are grouped in the several cases; no two cases being exactly alike.

The second, or the sudden attack of chronic softening, is the most common form of the disease. This form completely resembles an attack of cerebral hæmorrhage at first; and though in some cases the faculty of speech is partially recovered, and even the mental powers themselves, there still most commonly remains the loss of voluntary power, and the involuntary passage of the evacuations. Contractions of the limbs are often present. These states may last for months or years without improvement, or stationary. In other cases, symptoms of resolution of the disease show themselves, by the person experiencing that sensation which, in the first form, ushered in the complaint, viz. itchy and prickly sensations in the skin of the extremities, headach, pains and numbness in limbs, and gradual restoration of the powers of locomotion. A number of valuable cases are narrated, to show the different varieties which this second form of chronic softening assumes, and the close similarity which many of them bear in their symptoms to cerebral apoplexy.

In the third form of chronic softening the person has in general long complained of headach, numbness, formications in the skin of the extremities, weakness of limbs, and contractions of the fingers or limbs, which may even have gone the length of complete paralysis, when he is suddenly cut off by an acute attack resembling that of cerebral apoplexy. In this case death may occur within a few hours, or may be delayed for two or three days. This is by no means such a common form as those formerly mentioned, only five cases of the affection being described.

The fourth or latent form of softening is never recognised till after death. In these cases the immediate cause of death may be disease of the lungs, brain, or other organs. In the cases narrated by the author a common cause appears to have been cerebral apoplexy.

It would appear that it is a matter of great difficulty to distinguish chronic softening from cerebral apoplexy and tumours of the brain. If contractions of the limbs, occasional epileptic paroxysms, and pains in the limbs are present, the case is rather to be viewed as one of chronic softening than of apoplexy. But almost the only symptom which seems to distinguish tumour of the brain or cerebellum from chronic softening is that the senses return after the paroxysm as before, in the case of the tumour, but are always found to be more affected than before, when the case is one of chronic softening.

The ninth chapter treats of the curability of softening, and the pathological process by which a cure is effected. It was mentioned above that the disease may become arrested at any of its stages and a temporary cure be effected. This chapter describes the

pathological appearances which the brain presents when one of these temporary cures has occurred; but the person has been eventually cut off by cerebral or other disease. The softened portion may become indurated so as to resemble cheese in consistence. If it has gone the length of the cellular infiltration the disease on its cure presents three different appearances, according to the length of time which has elapsed. The external surface of the cellular capsule assumes an almost cartilaginous hardness, and the remainder still remains filled with the chalky-looking fluid. Or a cavity is found still filled with the chalky fluid, and lined with a fibrous membrane. Or, lastly, the fluid is absorbed, and the walls adhering are absorbed, leaving a white cicatrix. Cases are narrated in which these different appearances were observed in the brains of those who had recovered for a longer or shorter time from symptoms of chronic softening.

The three modes in which death takes place, viz. death by the brain, death by the lungs, and death from sloughing of the skin, form the subject of the tenth chapter. It seems quite unnecessary to enter into these in detail. That by the lungs only occurs in the old or enfeebled, in consequence of hypostatic congestion or hypostatic pneumonia occurring; these always hasten the fatal result.

In noticing the prognosis of softening the author states that it is more favourable than is usually imagined, seeing that the general belief is that softening is invariably fatal. This last belief has been deduced from the conviction that softening depended on a kind of specific inflammation, or on gangrene; but the fact which he endeavours to prove in his next chapter, that it is dependent on common inflammation affecting the brain, renders the prognosis more favourable.

The nature and etiology of softening form the subjects of the twelfth chapter. In it the author reviews the various opinions which have been held relative to the nature of softening of the brain, and shows that, though ossification of the arteries of the brain, diseased heart, ligature of the carotid arteries, &c. may be accompanied by softening of the brain, it yet remains to be proved that the softening of the cerebral substance in these cases was identical with that which he describes. In those which are identical the nature of the softening was distinctly inflammatory—that state which he holds every case of true softening to be. He then shows that in the aged it is not dependent on an asthenic state, nor in any on a scrofulous or specific inflammatory action; and sums up by concluding that there is but one form of softening, that beginning by congestion, and terminating by inflammatory action and its results.

The author then shortly considers whether there is such a disease as white softening different from that which he describes, and shows that, under that term, authors have included, at least,

two very distinct states,—one, simple chronic softening, and the others, œdema of the brain. If the descriptions, however, of authors are to be trusted, a state of white softening does occur running the course of acute softening, but differing from it in exhibiting no apparent traces of red injection. A few cases of this form are quoted, and though the author shows it is possible that some of these were cases of latent chronic softening terminating suddenly, and that in others the congestion had probably disappeared, as the narrators supposed, he thinks it better to give the cases, and allow the profession to judge for themselves.

In enumerating the causes of softening, the author shows that, so far as yet observed, it is a disease which chiefly attacks those advanced in life. Cases occur at all ages, from seventeen and upwards; but it is chiefly persons above sixty years of age who are its victims. It would appear that it is more common during the heat of summer, than any other time of the year; but on the whole the influence of season is not very marked. It attacks equally the robust and the debilitated; but a considerable proportion of those were labouring under grave diseases, as those of the heart, &c. The heart was in general found healthy in those who were under fifty years of age; but of 41 cases of softening of the brain in individuals above that age, it was healthy in 28 only. In the others it was variously diseased, either hypertrophied, or with diseased valves. As the author, however, finds that in the Hospital of Salpetriere, the hearts of the aged are diseased in a fourth of all who die, while it is found diseased in a third of those who die of cerebral apoplexy, he thinks that much connection cannot exist between diseased heart and softening of the brain.

The last chapter proposes to consider the treatment proper for softening of the brain. Instead, however, of stating his practice, or laying down any general rules for the guidance of others, after a few preliminary remarks, he simply describes that pursued successively in two cases. This consisted in applying leeches, in small numbers, behind the ears, a blister to the nape of the neck, sinapisms to the wrists, and acting gently on the bowels. As the disease is one which prevails among old persons, he cautions against too active means being used, lest in endeavouring to quell one disease, we debilitate the already enfeebled powers of life, and more rapidly bring about a fatal result.

In a short appendix, the author directs attention to softening of the brain occurring in infants. This softening, always a difficult matter to ascertain, on account of the pulpy nature of the infantile brain, is found after death from various diseases, as well as in those who have died during birth; but how far these states are analogous to the softening observed in adults, M. Durand-Fardel does not venture to state.

- ART. VI.—1. *First Principles of Surgery, being an Outline of Inflammation and its Effects.* By GEORGE T. MORGAN, A. M., formerly Lecturer on Surgery in Aberdeen. London, Edinburgh, 1840. 8vo. Pp. 780.
2. *A System of Practical Surgery.* By WILLIAM FERGUSON, F. R. S. E., Professor of Surgery in King's College, London. With Illustrations by Bagg. London, 1842. 12mo. Pp. 596.
3. *The Principles of Surgery.* By JAMES MILLER, F.R.S.E., F.R.C.S.E., Professor of Surgery in the University of Edinburgh, &c. Edinburgh, 1844. 12mo. Pp. 716.

THESE works on surgery differ in some respects from each other; yet are all entitled to some attention.

The first may be described as a very excellent Treatise on Surgical Pathology, in which the author explains the leading principles of that science with much clearness and method. He begins, as is usual, with the history of Inflammation, explains its Semiology, Pathology, Terminations and Effects. The volume, indeed, is confined entirely to the examination of this subject. But as inflammation forms an essential part of all surgical diseases, Mr Morgan has contrived, with great talent and dexterity, to give a very complete and interesting view of what was wont to be termed Medical Surgery.

Mr Morgan was a surgeon and lecturer on surgery in Aberdeen, and the materials of the present volume are a concentrated view of the instructions which he was in the habit of communicating to his pupils. The work is highly creditable not only to his talents and industry, but to his faculties of observation and reflection. With a perfect knowledge of every thing done before him, and all the illustrations furnished by the diligence of contemporary inquirers, Mr Morgan shows very considerable originality and great strength as well as soundness of judgment on all the topics embraced by his plan. His observations on suppuration, the different forms of ulceration and ulcers, and those on mortification are well entitled to attentive perusal.

Nothing proves so forcibly as the appearance of this work, the utility of the medical schools of Scotland as educating establishments, or the amount of sound medical knowledge acquired by those educated there. Here is written, by a provincial surgeon, a work which, for the style in which it is composed, the correct information, and the just views which it contains, will bear comparison with any work published by authors in the metropolis, enjoying every advantage. The work, we fear, has not received the

attention which it deserves. It may be safely recommended as an excellent treatise on the leading principles of surgical pathology.

The other two works in our list are examples of that taste for the manual form of publication which we some time ago mentioned as evincing itself so strongly and generally. It is only, however, as we then said, in external characters that they can be said to be manuals. In the matter which both contain, and in the detailed mode in which the information is communicated, they may be regarded as elementary treatises, presenting to the student all that is requisite for him to know.

These two treatises, though agreeing in the circumstances now mentioned, present certain peculiarities deserving attention.

That by Mr Fergusson is perhaps the most ample in details, especially on the subject of surgical operations. It is also illustrated by numerous beautiful woodcuts, representing instruments, plans of operations, and modes of treatment, which render it very useful to the junior student. Mr Fergusson has also introduced a proportion of cases, which may be useful in fixing the principles on the mind of the reader.

The treatise of Mr Miller is more strictly didactic; and the author confines himself very much to giving a condensed view of the present state of surgical pathology and operative surgery.

Prefixed is a sketch of the history of surgery and its various improvements, from the days of the Greek and Roman practitioners to the present time. This the student will peruse with interest and much advantage.

The work is divided into four sections and twenty-two chapters. Under the first section, on elementary disease, the author treats of inflammation, its varieties and effects; in the second, devoted to perverted vascular action in certain tissues, he treats of rose, carbuncle, and inflammation in the bones, joints, artery, vein, lymphatic, and nerve. The third section, on perverted nutrition, is devoted to the subject of tumours; and in the fourth are treated all external injuries and their consequences.

In the work itself it appears to have been the main object of the author to communicate just and accurate ideas on the nature, distinctive characters, and tendencies of those diseases, the treatment of which falls under the province of the surgeon. In this we think he has been eminently successful. To the student who wishes to acquire a useful practical knowledge of the pathology of surgical diseases, it is impossible to recommend a better guide than the present treatise by Mr Miller.

Account of the late Dr Abercrombie.

THE death of Dr Abercrombie, which took place on the 14th of November, has induced us to insert the following sketch of that eminent physician, from materials furnished by his medical attendant, Dr Adam Hunter.

JOHN ABERCROMBIE, the only son of the Rev. George Abercrombie, minister of one of the three pariah Churches, Aberdeen, was born in the year 1780. The rudiments of education he received at the grammar school of that city, and was afterwards a student at the literary and philosophical classes at Marischall College.

Being destined for the medical profession, he came to Edinburgh in 1800, and resided under the roof of the Rev. David Black, minister of Lady Yester's Church. Having gone through the usual course of education at the medical classes in the college, he graduated there in 1803, after having written and defended an inaugural dissertation *de Fatuitate Alpina*, or Cretiniam.

He then went to London, where he spent nearly twelve months in attending lectures and the medical practice of St George's Hospital. In 1804, he returned to Edinburgh, and having joined the College of Surgeons in 1805, began to exercise the practice of his profession, as surgeon and general practitioner in Edinburgh.

He in no long time became attached to the Royal Public Dispensary, and devoted much time to the relief of the ailments of the poor. The attention which he bestowed on all cases, and his zeal and diligence in seeing as many examples of disease as possible, soon procured him many patients; and while he made a practice of observing and noting the leading circumstances of each case, from its origin to its termination, he derived considerable assistance from the numerous pupils who were placed under his care. Though several of the Edinburgh surgeons have been in the habit of initiating their pupils in this manner, into the practice of observing the phenomena and conducting the treatment of disease, yet Dr Abercrombie was probably the first who organized among those gentlemen committed to his charge a very complete system of elementary and practical medical instruction. The junior pupils he directed in the course of their studies, and in the choice of the books to be read; and the senior pupils, who were capable, he employed under his own immediate inspection in attending and treating patients and reporting on their cases. In doubt or in difficulty he was always at hand to direct what was to be done, or do what was necessary for the relief of the sufferer.

In this manner Dr Abercrombie was capable of observing a very great number of cases of disease, while his natural acuteness and readiness enabled him very speedily to recognize the true nature of a disease, and to see what was required for relief or removal. For a long series of years at this time he kept notes of almost every case that he saw, and traced its termination in recovery or in death. Morbid inspections, also, in fatal cases, he was active and zealous in procuring; and before the close of 1816, he had probably inspected a greater number of bodies cut off by disease than any other medical practitioner in Edinburgh.

These labours at length began to produce their legitimate fruits. At that time medical pathology, or the doctrine of the true nature of internal diseases, was not much studied, and the knowledge, such

as it was, was confined to few. Surgery, surgical anatomy, and new operations, had engrossed the larger part of the genius of the profession, the consequence, perhaps, of a lengthened period of warfare. Physiology afterwards, especially experimental physiology, had also several cultivators. But medical pathology, the most important of all, was systematically studied by few.

To this subject Dr Abercrombie had been long directing his attention; and we are certain that in almost every case which he saw, and every instance in which he had an opportunity of inspecting the parts after death, he beheld the means of extending the limits of medical pathology, rendering it a more precise science, rectifying many errors, supplying many defects, and thereby improving greatly the treatment of diseases.

Accordingly, after communicating, in the 12th volume of this Journal in 1816, two short cases of *cynanche laryngea*, a disease from its speedy fatality, invested with peculiar importance, and a good paper on the employment of the tobacco enema in *dysuria*, he published, in 1818, in the 14th volume, a valuable essay on the diseases of the spinal chord, which may be regarded as one of the first systematic efforts to elucidate the nature of this order of maladies. This was soon followed by an essay on acute or inflammatory dropsy, illustrating the efficacy of blood-letting by a series of well-marked cases of the disease.

The essay on the diseases of the spinal chord was preliminary to other three essays, two of which, that on chronic inflammation of the brain and its membranes, and that on apoplexy, appeared the same year, 1818, in the same volume, (14); while the third part on paralysis, and the fourth on organic diseases of the brain, followed in next volume, in the course of 1819. These essays, the result of twelve years' incessant observation, presented the most comprehensive and elaborate view of the subject then extant; and tended much to rectify and extend the knowledge of medical practitioners on that obscure and intricate subject. These essays subsequently formed the basis of the work on diseases of the brain and spinal chord, published in 1828, and reviewed in our 29th volume. This volume, which has since been quoted and referred to by all who have written on the same subject, was reproduced in a second edition in 1829, and in a third in 1834, and it now forms part of the library of every scientific physician.

The same year Dr Abercrombie published a short paper on a peculiar cause of breathlessness in children; and which, like all his performances, shows much originality.

In the course of 1820 appeared in volume sixteenth four papers on the Pathology of the Intestinal Canal, illustrated by a series of interesting cases, and with observations, both original and ingenious, especially on ileus. These essays, with three subsequent papers on the diseases of the stomach, pancreas, and spleen, published in the 21st volume in the year 1824, formed the basis of the volume afterwards published in 1828, and again, in a second edition, in 1830. Of this work we gave an account, and expressed an opinion in our 31st volume.

In 1821, Dr Abercrombie published in the 17th volume of this

Journal his Essay on the Pathology of consumptive diseases. To the affections of the lungs and heart he had always directed great attention; and in this paper he gives a condensed view of the result of his observations on the diseases of the lungs, especially those presenting the characters of consumption; and in the first volume of the Medico-Chirurgical Transactions of this city he published the results of his experience as to Diseases of the Heart. (1824.)

These essays, with some observations on *ischuria renalis*, inserted also in the 17th volume of the Edinburgh Journal, form the whole of Dr Abercrombie's strictly professional writings.

Dr Abercrombie was always much engaged in professional occupation, so much so, indeed, that, to those who knew him intimately, it appears wonderful that, amidst so much professional labour, of a nature rather arduous, he could find time to write so much as he did. Nothing but great zeal with indefatigable industry and method could have enabled him to accomplish the duties which, as it were, he imposed on himself.

Though he commenced as surgeon and general practitioner, and always felt interest in surgical cases, yet gradually his practice tended to medical cases chiefly; and even in 1819-20 and 21 he was much consulted by his professional brethren as a physician. In 1822, the illness, and eventually the death of Dr Gregory was followed by a change in the consultation practice of this city and, indeed, the south of Scotland. The sick and their advisers looked then to Dr Thomson and Dr Abercrombie; and, in many cases, both were conjoined.

Though much engaged in the duties of a solicitous profession, he yet found time, not only to enlarge and rectify his first professional essays, but to write other works on subjects certainly not less obscure and difficult. In 1830, he published his *Inquiries concerning the Intellectual Powers and the Investigation of Truth*, and, in 1833, the *Philosophy of the Moral Feelings*. Though these performances cannot be regarded as original, both have been very popular, and have passed through several editions.

Dr Abercrombie continued after this period to divide his time between his professional duties, his family, and writing short essays on some of the practical duties of religion, with the view of directing the attention of all classes to the serious and important duties of life. These essays have, we believe, enjoyed a very extensive circulation.

Dr Abercrombie was fortunate in enjoying for a long series of years very steady health; and his time was not interrupted from any serious illness till 1841. On the 21st of November, however, in that year he suffered an attack of some disorder in the circulation of the brain, which filled him with much apprehension as to its subsequent effects both on his mental faculties and on his corporeal frame. The following account of this illness is given by Dr Hunter, who observed it during its whole course.

"Sunday, 21st November 1844.—About 11 o'clock A. M., Dr Abercrombie, while driving to a professional visit in the old town, was suddenly attacked with loss of sensation and power of left side, instantly followed by general prostration of strength,

accompanied by slight headach and oppression, but no loss of consciousness or memory. He ordered the coachman to drive home immediately, sent for Mr Cafe the cupper without delay, who, by the time I reached the sick chamber, had abstracted about ten ounces of blood from the temple. Dr Abercrombie's countenance gave expression of the deepest anxiety; the face was pale; skin cold; pulse 100, small and contracted; and there was frequent deep sighing. He complained of a feeling of uneasiness about the pericardium, which induced him to seek relief by deep inspirations. The speech was unaffected; there was no distortion of features; there was no confusion of thought nor of language. He possessed perfectly the muscular power of the left arm and leg, moving them freely in all directions—pressing firmly with the hand—at same time handling minute objects with accuracy—while he firmly maintained that the natural sensation or perception of the whole side was greatly impaired. In a short space of time 3xxvi. of blood were taken by the cupper, after which Dr Abercrombie walked once or twice through the room firmly, and without any very apparent dragging or inequality in the movements of the left leg. He now went to bed, and took 4 scruples of the compound jalap powder, with 5 grains of calomel. The pulse soon after fell to 84; in four hours the medicine operated freely, after which the pulse became more natural.

At 8 P. M. the pulse had risen to 94, more full and developed in character, and accompanied by a higher temperature of surface. Dr Abercrombie's own sensations remaining unaltered and slight headach still existing, it was determined, in consultation with Dr Alison and the late Dr A. Ross, to open a vein in the arm, as much, or more, to satisfy Dr Abercrombie's own anxious views, than from any conviction of its necessity or propriety. 3xxv. of blood were withdrawn, which had a very decided effect upon the pulse, reducing its force and frequency, and inducing an approach to syncope.

During the day Dr Abercrombie's mind has been most anxiously affected relative to the issue of his attack; expressing his conviction that it was hemiplegia, and, although not now fatal, it was to be the close of a busy and active career.

Monday 22d, 10 A. M. Syncope occurred in the early part of last night, and, when up at stool, he fell with force on his left side. Subsequent to the syncope, he began the use of an antimonial solution, passed a quiet night, with some sleep. Slight headach; pulse 68, very soft and compressible; heat of skin moderate and perspirable; tongue clammy; incessant yawning; admits a diminution of intensity in abnormal sensations of left side; seems to have complete command of all the muscles of his limbs. Some doubts are entertained in consultation whether the tongue is drawn a little to the right side, or whether it is the result of natural action, the formation of the mouth and jaws not being quite symmetrical. Mind still painfully anxious regarding the issue of his illness. Head to be shaved, and cold applications and antimonial to be continued. 2 P. M. Mind still apprehensive, expressing a wish for further active treatment, which to all of us appears inadmissible.

Tuesday 23d, Proceeding favourably, and by his own admission

he is better to-day, having slept well during night. Abnormal sensations declining in intensity ; pulse 66, soft ; skin generally and of head cool ; anorexia from continued use of antimonial solution ; no motion from dose of pills taken last night ; tongue white and clammy. Omit the antimony ; the jalap and calomel purge to be repeated ; rice and milk for dinner.

Wednesday 24th, Improving. Was in the drawing-room for some time last evening ; did not sleep so well last night ; pulse natural ; tongue cleaning. Complains of pain of left shoulder and elbow, more than of the numbness ; pain also of left thigh, which, on examination, is found to be extensively ecchymosed, in consequence of the fall from syncope after venesection on evening of 21st ; the pain of arm probably from similar cause. A saline laxative to day.

Thursday 25th, Was in the drawing-room for many hours yesterday ; wrote two consultation letters ; walked frequently through the room, making every variety of motion, anxiously wishing to ascertain the amount of muscular power in the affected side. These trials were pursued to an injurious extent—unduly exciting the heart's action, and not imparting much comfort to his mental anxieties. The result has been a bad night, with some degree of throbbing and confusion of head, a greater degree of apprehension, and an anxious desire for further active measures. Three colocyath pills were taken last night ; three more this morning with a black dose before breakfast, producing before two p. m. three purging motions, which left him much exhausted, and, I rejoice to say, have carried conviction to his own mind, that there is no further demand for active treatment ; pulse 59, very feeble.

Friday 26, Greatly improved to day ; mind less gloomy ; bodily strength improved ; he walks now with a tolerably firm, and to my observation, nearly equal step.

Saturday 27th, Much as yesterday.

Monday 29th, Countenance improving ; ate fish for dinner, and feels the digestive process less oppressed this evening. A moderate dose of rhubarb and magnesia twice daily.

Tuesday 30th, Decidedly better to day ; in better spirits, and seems disposed to take a drive.

Thursday 2d December, With the exception of slight catarrhal symptoms, he is now advancing towards a perfect recovery."

After his recovery in December 1841, Dr Abercrombie began gradually to resume professional duties, and his health seemed very nearly re-established. He was indeed pale ; but he seemed to move and walk much in his usual manner ; and his intellectual faculties seemed as acute and active as ever. In consultation he appeared to take as much pains as formerly in ascertaining the state of the patient, and to feel as much interest in learning the result, and observing the operation of remedies. In other situations also, for example, the private business at the College of Physicians, he was active, and evinced much interest. He was indeed cautious and guarded in avoiding any thing that he believed would be prejudicial to his health ; and upon this ground he had declined the re-

quest made by several fellows of the college, that he would permit himself to be chosen president of the college. Nothing, however, seemed to indicate that his mortal career was so near its close.

On Sunday the 10th of November, in consequence of feeling some catarrhal symptoms, he had remained within doors. Dr Alison was visiting one of the servants; and in accompanying Dr Abercrombie up stairs, the former gentleman observed that Dr Abercrombie was a little breathless, and required to stop until he recovered himself. This had, however, disappeared, and was not afterwards thought of.

Dr Abercrombie was out on professional business on Monday, Tuesday and Wednesday; and he had made an engagement to meet a professional gentleman (Dr Purdie) for visiting a patient next morning (Thursday,) at 10 o'clock A. M. After performing with his family the usual devotional duties of the day, he took breakfast with rather better appetite than he had done for several mornings previously, and he then went up stairs to the attic floor to visit the female domestic, who was still unwell. On coming down stairs he had retired into the dressing-room adjoining his own apartment, preparatory to entering on the business of the day.

The rest may be told in the words of Dr Hunter.

"The carriage and every other preparation had been in readiness for some considerable time, when apprehensions began to be entertained, in consequence of his prolonged absence, which were greatly increased by Dr Purdie's sending to inquire into the cause of the doctor's unusual delay. It was at length resolved that the butler should go into the private apartment, on opening the door of which, he saw his master lying on the floor, with his face resting on the carpet, as he (Dr Abercrombie) appeared to have fallen forward in the act of leaving the closet. The servant rushed forward to raise his master's head, in doing which, and while other attendants were assisting to remove Dr Abercrombie to a sofa in the adjoining room, the butler heard two or three slight convulsive inspirations,—the last and only signs of animation.

I must now mention in order, that on coming home for a little, after performing some morning visits, at 20 minutes before 11 A. M., I received an urgent request to proceed to Dr Abercrombie's house, as it was stated that he had been taken suddenly and seriously unwell. Apprehending that an attack of apoplexy had taken place, I made the utmost haste, but on reaching the scene of my anxieties I found the patient completely lifeless.

I now began to form conjectures as to the probable cause of so very sudden a termination of life; and the two theories which presented themselves to my mind were;—1st, Apoplexy with rapid and very extensive effusion producing profound coma, during which respiration was obstructed in consequence of the attitude of the body, the mouth and nostrils thereby resting in contact with the carpet, and being surrounded by a portion of mucus which had escaped from these passages; 2. Rupture of the heart, or of a small aneurism of the aorta within the pericardium.

Although during life no sign or symptom had been known to justify this latter conclusion, yet this view of the cause of death I was

inclined to adopt from the history and rapid termination of the seizure, as well as from observing that the cardiac region was much more extensively dull on percussion than in the normal state,—a sign which I had pointed out as diagnostic of the disease of which a gentleman died suddenly in the month of August last, and at the *post mortem* examination of whose body by Drs Skae and Bairnsfather, it was found a small aneurism at the offgoing of the aorta had burst into the pericardium.

At this stage of my reflections, about seven or eight minutes after my arrival, Dr Alison made his appearance, to whom, after he had made his own inquiries and observations, I mentioned my views. In these he seemed to coincide, and stated, that on the Sunday preceding he had remarked for the first time that Dr Abercrombie appeared breathless in going up stairs to visit the sick domestic to whose case I formerly alluded. I have since learned from Dr Abercrombie's family, that, on Wednesday evening preceding his death, he had run up stairs with a light step and exhibited no signs of difficult breathing. Dr Alison, however, felt that the true cause of death ought not, if practicable, to be left in obscurity, but that the most minute information should be procured for the satisfaction of our professional brethren. Having, for the attainment of this object, received the acquiescence of Dr Abercrombie's family, I secured the co-operation of Mr Goodsir, Prosecutor in the University, who, in the presence of Drs Alison, Renton, (president of the College of Physicians,) Gillespie, Begbie, Cumming, Mr H. Goodsir, Mr J. A. Hunter, and myself, instituted a very careful scrutiny into the state of the brain and heart, and, at my request, drew up the subjoined report of the morbid appearances."

Morbid Appearances in Dr Abercrombie's Case.

"**Head.**—The skull-cap was thick. The *crista galli*, the posterior clinoid processes, and the bones of the head generally were powerfully developed.

The brain was softer than might have been expected at the time of the examination ; (fifty hours after death.) There were no traces of old or recent effusions of blood. The internal carotid, the circle of Willis, and all the arteries of the organ were studded with much atheromatous deposit, and the internal carotids, at their last curve, were slightly dilated. The organ was of great size, and weighed 63 oz. avoirdupois. The ventricles were capacious, without an increased amount of serum, which appeared to correspond to the great size of the cavities.

Heart.—The pericardium contained a large clot of blood, enclosing the heart like a mould.

On the posterior surface of the left ventricle, two-thirds from its base, and about one inch and a half from the septum, there was a fissure or rent, a quarter of an inch long, in the direction of the fibres of the ventricle, with ragged and ecchymotic edges. Towards this fissure a considerable branch of the left coronary artery passed, but did not open into it. In the fissure the ruptured orifice of a vein was visible ; and a bristle introduced into it passed on towards the base of the ventricle, and appeared on the cut surface of

the posterior wall of the ventricle, made on opening the heart. In the neighbourhood of the rupture two irregular ecchymotic spots were situated, through which passed branches of the coronary artery. These spots consisted of effused blood, but their connection with ruptured vessels could not be distinctly made out. The serous membrane over them was quite entire.

Both coronary arteries were much dilated as they passed off from the aorta. Throughout their course they contained in their walls much atheromatous matter, but were not ossified. The aorta and its semilunar valves also contained a considerable amount of the same deposit; but the former was not enlarged.

The heart was slightly enlarged and dilated, rather loaded with fat, and remarkably soft, as if from interrupted nutrition. All the cavities of the heart were found empty. Extensive adhesions of the right pulmonary and costal pleurae.

The other viscera were healthy."

"Let me now state, in addition to what has been entered in my notes of November 21, 1844, that in my opinion the expression of Dr Abercrombie's countenance was entirely at variance with the ordinary characters of the apoplectic or paralytic condition. In truth, his eye was keen and penetrating; and well do I remember that the impressions excited in my own mind were that he wished to read in the expressions of my face, or in my language, the negation or realization of his own intensely wrought fears. The apprehension of paralysis, with progressive cerebral or spinal disease, continued throughout the day to alarm his mind; and when reaction, after the cupping and collapse of the morning, did occur, nothing would seem to allay his anxieties or tranquillize his apprehensions but a full influential bleeding. To this measure Dr Alison, the late Dr A. Ross, and I were directly opposed at the bedside of our patient, and when the subject was fully discussed in consultation afterwards, it was reluctantly agreed to surrender our views to our patient's wishes, which in reality amounted almost to authoritative directions. The subsequent parts of the treatment were in harmony with Dr Abercrombie's own deep-rooted impressions, and were followed in rapid succession until Thursday 25, when a consciousness of extreme debility was forced upon him by the hypercatharsis of that day, after which date farther active measures were abandoned.

I have been anxious to bring this part of my subject prominently under the notice of the society, as I am disposed, in part, to trace the origin of that remarkable softening, which preceded the rupture of the superficial fibres of the left ventricle, to the active treatment instituted in November 1841. The degeneration of the muscular structure and remarkable softening of the heart may no doubt be accounted for by the atheromatous condition of the coronary arteries; and to this cause I am led to suppose that Mr Goodsir and other pathologists would trace it. But I cannot overlook the important influence which so large an expenditure of the vital fluid may have exercised in hastening the progress of this affection, particularly as it now appears, by the *post mortem* examination of the brain, that such active measures were not requisite, at least to the

extent they were carried ; and that, too, in a state of constitution which could not at the time well tolerate so large a drain. On this point I would further remark, that, while I lay no claim to the title of an experienced pathologist, yet I shall venture to state that I have witnessed several examinations of diseased hearts with atheromatous and osseous conversions of the coronary arteries to a greater extent, without an amount of softening at all commensurate with what was ascertained to exist in this case.

When I first formed the intention of arranging the materials of this interesting case into a definite shape, it was simply with the view of placing on record an account of the secondary physical causes which had removed from among us our much valued friend. But the investigation having brought to light a new, and, as far as I have been able to ascertain, an unique pathological phenomenon. I have looked into the works of Morgagni, Corvisart, Otto, Hope, and others, without finding any parallel instance of rupture of a few superficial fibres of the left ventricle, with opening of coronary vein, as the source of fatal hæmorrhage. The hæmorrhage, however, must not be looked upon as the direct cause of death, either from the amount which was actually withdrawn from the circulating mass, nor yet from the rapidity with which it took place, inducing fatal syncope, but rather from the gradual accumulation of the clot within the pericardium, embarrassing the actions of the heart, and at last increasing to such a degree as to prevent the cavities from dilating to receive the blood from the systemic and pulmonary vessels, a view which is supported by the empty state in which the auricles and ventricles were found.

This view of the progress of fatal effusion also is more in consonance with the history of the circumstances which actually took place at the time of death. Dr Abercrombie had been absent from about 10 o'clock till he was discovered by his servant lying on the floor of his private apartment, about 30 or 35 minutes past 10, and when the servant raised his master's head, he heard two or three alight convulsive inspirations, proof sufficient that life had not fled at the first moment of the fatal rupture."

Of the intellectual character of Dr Abercrombie it is unnecessary to speak. Its peculiarities appear in his writings, and were manifest in his daily duties. His mind was as completely practical as it is possible to imagine. In all his researches and inquiries, while one object was truth and accuracy in results, another was the practical application. With him the object was as speedily as possible to determine what was to be done, what could be done, and how it was to be accomplished. In consultation this feature of his mind was, it always appeared to us, one of the most prominent. And in his work on the intellectual faculties, one of the leading objects is to apply psychological knowledge to the study of medicine, the estimation of medical evidence, and the establishment of the accuracy of medical reasonings.

PART III.

MEDICAL INTELLIGENCE.

ANATOMY AND PHYSIOLOGY.

Anatomico-physiological Researches on the Uses of the Thymus Gland. By Sig. PICCI. (*Annali Universali di Medicina*, September 1843.)—Sig. Picci, after refuting the two hypotheses of the uses of these glands, viz. that proposed by Verheyen, and afterwards adopted by Caldani, that the gland served for the elaboration of lymph before it was thrown by particular canals into the thoracic canals; and that proposed by Hewson, that it secreted a particular fluid, which by mixing with the mass of the blood facilitated assimilation,—proposes a new one. According to him the thymus occupies the place of the lungs. Its uses are therefore in a manner mechanical, and consist in maintaining the necessary relations of the lungs to the size of the chest before and after birth. He begins by endeavouring to prove that there exists a law of organization, by which there exists a constant relation between the proportion of the different parts in the development of the chest. The lungs are, so to speak, atrophied before birth, because they have no functions to fulfil; and as they cannot at that period fill the cavity of the chest, nature occupies their space with the thymus gland. This organ, says he, is the more developed, the less the lungs are; and in the new-born child it allows them more free space as it rapidly becomes atrophied. In fact, it is only in the adult that the thorax is perfectly modelled on the lungs; whilst in the infant it is the thymus which occupies their place in the thorax. If this organ did not maintain the chest of the necessary size, the chest would have been modelled over the lungs themselves. But as the bones require a longer time for their development than the lungs, these last would have been subjected to a too great compression after birth, seeing they not only enlarge by the progress of nutrition, but by the admission of air into their interior. The situation of the thymus in the median line, in the anterior mediastinum, its consistence, its greater breadth below, are adduced as so many arguments in favour of this being its use. The author also alludes to the fact of this organ being present in all those lower animals who have lungs constituted like those of man; whilst it is wanting in those animals which respire by means of membranous lungs or by branchiæ. In the hibernating animals, the thymus alternately increases and diminishes in size; whilst in the amphibious animals it presents its maximum of development. Lastly, Sig. Picci sees an additional argument in favour of his hypothesis from the pathological fact which he has ascertained, that in phthisis pulmonalis the thymus gland is found of tolerable size.

Researches on the Functions of the Spinal-Accessory Nerve. By M. CLAUDE BERNARD of Villefranche. (*Archives Générales de Médecine*,

April and May 1844.)—Two opposite views have been held relative to the functions of the spinal-accessory nerve; the one, that of Sir Charles Bell, that it was a respiratory nerve; the other, that of Bischoff and Longuet, that it was a nerve of motion, and held to the pneumo-gastric nerve the relation of an anterior root. Dissatisfied with the latter view especially, which is nevertheless the prevailing one at present, M. Bernard instituted a rigorous inquiry into the subject, and has arrived at some curious results. In his long and interesting memoir, he first shows, from its anatomical relations, that it cannot be regarded as equivalent to the anterior root of a spinal nerve for the following reasons. *First*, It distinctly originates from the posterior lateral groove of the chord, while all the nerves of motion originate from the anterior lateral groove. *Secondly*, The nerves of motion are larger if the organs to which they are distributed be of enlarged size. This, however, is not the case with the spinal-accessory, seeing that its internal branch is not larger in those animals which have a complex stomach, than in those whose stomachs are simple. *Thirdly*, When the two roots of the spinal nerves unite, they form an intimate union by decussation of the component filaments, so that it is impossible afterwards to separate them. The filaments of the spinal-accessory, however, never so unite with those of the pneumo-gastric, but may be traced by dissection, as separate filaments, to their ultimate distribution. They are simply in close contact with the pneumo-gastric.

M. Bernard, then, by quoting the experiments of Bischoff and Longuet, on which their opinion was founded, demonstrates that they are incapable of proving any thing, seeing that the operations to which the animals were exposed were so severe, and the hemorrhage so great, that the animals died before the common trunk of the spinal-accessory was reached and cut across.

The operation performed with this view, by M. Bernard, did not endanger the life of the animal. It consisted in cutting down on the external branch of the spinal-accessory where it becomes disengaged behind the sterno-cleido-mastoid muscle, and following it down to its origin from the common trunk in the *foramen lacerum*. The spinal-accessory was then carefully isolated, and seized with forceps in a longitudinal direction, and traction carefully made on it till it gave way. A long conical-shaped chord was then drawn out, which, on examination, was found to be the whole nerve pulled up by its very roots. This was done on both sides; and the animal quickly recovered from the operation, and lived for months, or till it was killed. The experiments were performed on cats, rats, rabbits, dogs, and a horse.

In all these animals thus operated on, the voice was abolished, but neither the circulation, digestion, nor respiration had experienced any change. All these functions remained as before, during entire months, till the animals were killed. In the details of the experiments it appeared that when the animals were made to walk quickly, the respiration became hurried, and the animals seemed as if short-winded, and had soon to stand still. When in this state, too, the deglutition became difficult, and the animals presented symptoms of some of the food passing into the windpipe. In a state of quiet, however, the animals swallowed well, though slowly, and raising the head at each act of deglutition; and digested their food as if they had undergone no such operation.

When the larynx was exposed during life, the glottis was invariably found open in all its extent, and the *chordæ vocales* relaxed. The laryngeal mucous membrane retained all its sensibility. When the animal, from pain, wished to cry, a column of air was forcibly expelled from its lungs; but no cry was formed, as the glottis remained fully opened, and the *cordæ* remained relaxed: a kind of blowing sound alone was emitted. This sound was of short continuance, as the expiration was rapidly inter-

rupted by a sudden act of inspiration, which occasionally produced a slight snoring sound.

When the animal was killed, it was found that both spinal-accessory nerves had been completely removed, but that neither stomach nor lungs had undergone any morbid change. If the animal, however, had been irritated whilst eating, and had exhibited symptoms of choking, the lungs were found variously diseased from the presence of tuberculous-looking masses in different portions, chiefly in the upper lobes. These on examination were found to consist essentially of portions of the food which had passed into the windpipe and filled some of the ramifications of the bronchii. When the bronchial tubes were split open, the nature of the food was easily recognised. These portions of food had produced the usual effects of foreign bodies in the bronchi.

The effects of cutting the inferior laryngeal or recurrent nerves were very different from those produced by dividing the spinal-accessory nerves. In several comparative experiments which M. Bernard made, this fact was strikingly manifested. Thus in a cat, when the right recurrent nerve was divided, the voice became hoarse and the respiration oppressed; and when the left nerve was cut, the animal died suddenly of suffocation. In another cat removal of both spinal-accessories merely produced abolition of the voice, but the respiration remained free as before. In a third cat, the spinal-accessories were first removed, producing merely loss of voice. Two days after both recurrent nerves were cut, when the animal immediately died of suffocation.

Experiments were made on the dog, cat, and horse, to ascertain the effect of section of the external branch of the spinal-accessory. Some irregularity of movements of the anterior extremity, shortness of breath on exertion, apparently from insufficient dilatation of the chest, requiring the animal soon to come to rest, were almost the only changes remarked. The voice remained unaltered, only less continuous than before. Indeed the expiration was shorter, and the additional muscular efforts required for the dilatation of the chest during exertions seemed not to take place.

From these experiments M. Bernard concludes, that "the spinal-accessory is a nerve of motion, which regulates solely those actions of the larynx and thorax which are connected with the production of voice, and those acts not immediately concerned in the maintenance of simple respiration." He therefore objects, but without apparent good grounds, to the placing of this nerve among the respiratory nerves, as was done by Sir Charles Bell, saying it ought rather to be considered as an "antagonist of respiration."

Researches on the Ovum and Corpus Luteum of Man and the lower Animals. By M. DESCHAMPS. (*Gazette Medicale de Paris*, July 20, 1844.) In our Number for April 1844 we gave an account of the interesting researches of M. Raciborski on the periodical deposition of ova by woman and the females of the lower animals, and as M. Deschamps' views, though not apparently founded on such extensive inquiries, differ in one important point from those of M. Raciborski, we give a short extract of them.

M. Raciborski states that during the menstrual or rutting season one or more ova are developed and thrown off, whether the ova be impregnated or not, and that the place from which the ovum or ova are thrown off is marked by a *corpus luteum*. M. Deschamps denies this, and states that a corpus luteum is alone formed when impregnation has taken place, and that the periodic deposition of ova during the menstrual or rutting season is only followed by a kind of false cicatrix, but by no corpus luteum. While M. Raciborski therefore regards the existence of a corpus luteum as simply marking the menstrual periods, and proves it by a reference to numerous dissections, M. Deschamps regards it as a "certain indication

of the fruitful union of the sexes," but refers to no dissections in point. M. Deschamps' description of the true corpus luteum exactly agrees with that which M. Raciborski describes in many species of animals as occurring every menstrual period without access to the male. M. Deschamps describes the ovum at every menstrual period not as being deposited, but as bursting or shrivelling, unless impregnation takes place, when he conceives it is expelled by a particular mechanism. M. Raciborski, on the other hand, from a reference to his numerous dissections of the ovaries of birds and the lower animals, shows that the ovum is discharged entire at every menstrual period, and by the same mechanism as when impregnation has taken place; that the deposition of the ovum and the formation of a corpus luteum are quite independent of access to the male; and that in some entire classes of animals the ovum is not fructified till it be expelled from the body of the female, or is just ready to be so.

Effects of extirpation of the Spleen and Thyroid Gland. By M. BARDELEBEN. (*Comptes Rendus des Seances de l'Academie Royale des Sciences*, March 1844.)—From M. Bardeleben's experiments, it results that the animals which survive the extirpation of the spleen appear to recover their health, and present no difference from those which have not undergone this operation. He never remarked that they were more voracious than other animals, though it has been said that voracity is generally produced. In no case was the organ regenerated, though Mayer of Bonn observed this. After removal of the thyroid gland the health was not sensibly affected; in one rabbit, however, the venereal appetite was considerably augmented,—a circumstance worthy of remark, seeing that it has often been asserted that removal of that gland abolished the venereal appetite. The animal deprived of both spleen and thyroid gland presented no change in any function. This fact is in opposition with the opinion of Tiedemann, that the lymphatic glands and thyroid body performed the functions of the spleen when that organ was extirpated. Finally, some physiologists have advanced the opinion that extirpation of the spleen produced augmentation of the venereal appetite, but abolition of the procreative faculty. M. Bardeleben satisfied himself of the incorrectness of this opinion, by breeding dogs which had both spleen and thyroid extirpated.

PATHOLOGY.

Case of Rupture of the Heart. By M. BODINGTON, Esq. (*Provincial Medical Journal*, Nov. 18, 1843.) A man, 70 years of age, after feeling unwell for about a week, was suddenly seized with a violent pain in his side. The pulse was very slow, and scarcely perceptible at the wrist; the skin was covered with a cold clammy perspiration; and the countenance was expressive of intense anxiety. He died in about nine hours afterwards. The pericardium was found distended to the utmost with fluid and coagulated blood. The heart was of the usual size, but covered with an immense quantity of fat, and much softened in its texture; in fact, it seemed to have undergone the fatty degeneration. On the left ventricle, near to the septum, two lacerations communicating with each other were observed; they, however, united in one, and opened by a single aperture into the ventricle. The aperture admitted an ordinary-sized blow-pipe. The walls of this ventricle were of the usual thickness, but thinned somewhat at the seat of the rupture. The right ventricle appeared healthy; but its walls were somewhat attenuated. No trace of disease of the valves nor of the arteries could be discovered.

In the same Journal a very short notice is given by Mr Challice of a case in which the right ventricle gave way. A housekeeper had complained of faintness and sensation of a load at the chest during the evening, and suddenly expired almost immediately on getting into bed. The pericar-

dium was found quite distended with blood, and a small perforation, scarcely larger than a crow-quill, was discovered on the right ventricle of the heart, close to the septum and near the apex. The muscular substance around it was not softened, and there was no disease of the great blood-vessels.

Prognosis of Chancre with reference to the probabilities of Secondary Symptoms. By M. RICORD of Paris. (*Provincial Medical Journal*, Oct. 1843.) In the report of M. Ricord's lectures, it is stated as the result of his extensive experience in the Venereal Hospital, that he has arrived at the following conclusions relative to the chances of secondary symptoms after a primary sore.

1. Primary ulcer is the indispensable precedent of secondary syphilis; without chancre there can be no general infection, except in the rare case of hereditary disease.

2. Simple non-indurated chancre and gangrenous chancre are very seldom, and only in exceptional cases, followed by secondary syphilis.

3. Indurated chancre always gives rise to constitutional infection.

4. The seat of chancre does not in the least degree influence the production of secondary symptoms. Provided the chancre be indurated, secondary disorder is as common and as constant after sores of the mouth, hand, nose, or foot, as after chancres of the penis.

5. The size of a chancre, the number of sores a person is affected with do not increase his chances of general infection, always provided none be indurated.

6. If the primary sore be destroyed during the six first days of its existence, no secondary symptoms will follow.

7. If six months elapse after the cure of a chancre (no mercury having been exhibited), without the appearance of secondary eruptions, all fear of constitutional symptoms may be laid aside.

THERAPEUTICS.

Copaiba more active when combined with Purgatives. By M. JACQUETANT. (*Gazette Medicale de Paris*, July 6, 1844.) M. Jacquetant gives a full account of the hospital practice of M. Diday in the cure of gonorrhoea, by which it appears that the balsam of copaiba acts much more energetically in the removal of that disease if combined with purgatives. Many instructive cases are shortly given of this mode of treatment, and compared with others in which the copaiba was administered alone, and also with others in which the cure was attempted by means of purgatives alone. The formula which M. Diday found most successful was three drachms of the balsam of copaiba, 44 drachms of the powder of cubebs, and 45 grains of the powder of jalap made into an electuary, of which the half is taken in the morning, and the remainder in the evening. The treatment rarely lasted more than five days, by which time a permanent cure was in general effected.

SURGERY.

Extirpation of the Lachrymal Gland for the cure of Fistula Lachrymalis. By M. PAUL BERNARD. (*Revue Medicale*, Dec. 1843.)—Some time ago M. Bernard communicated to the Academy of Sciences a case of cure of *fistula lachrymalis* by means of the extirpation of the lachrymal gland. This gland had only been previously extirpated on account of cancer; and the simplicity of the operation, as well as the rapidity of the cure, induced him to remove it for fistula. A man, 30 years of age, subject to a considerable discharge of tears from the left eye, but without fistula, had been subjected to most of the usual remedies for the cure of that disease. The canula, collyria, and ointments of various kinds, had been employed for a

period of ten years, but the watering of the eye still continued, and rendered the vision very confused. M. Bernard then determined to remove at least that part of the gland which appeared to be hypertrophied. A vertical fold of the skin on the outer edge of the eye was raised, and a bistoury pushed through it. This exposed the palpebral edge of the gland. This portion was found to be hypertrophied; it was drawn out by the forceps, and removed. The orbital portion of the gland was not at this time removed; but as, a couple of months after, the watering of the eye still continued, he removed the orbital portion of the gland also. No bad results followed: the wound healed rapidly; the watering of the eye disappeared; in fact, a perfect cure followed.

MIDWIFERY.

Cases of Premature Delivery. By M. SENLEN. (*L'Experience*, 30th May 1844.)—M. Senlen has excited labour prematurely 18 times in 7 women, in consequence of deformed pelvis. In 3 of these the deformity was produced by rickets; in 4 by malacosteon. Of the 13 labours in these 7 women only 7 children were born alive, and 4 of these died very shortly after birth. The antero-posterior diameter of the pelvis in these women was 8 inches in one, $2\frac{1}{4}$ in another, $2\frac{3}{4}$ in another, and in the rest less than 3 inches. Labour was induced by puncturing the membranes, and, according to the contraction of the pelvis, was brought on from the 29th to the 38th week of pregnancy. The average period, however, was on the completion of the 30th week, or 7 calendar months.

MEDICAL POLICE.

Resolutions relative to the Bill for the Better regulation of Medical Practice, adopted by the Royal College of Physicians of Edinburgh, at an Extraordinary Meeting, held on 11th October 1844.—1st, That the college testify their satisfaction that the bill for the better regulation of medical education and practice, so long expected, has at length been laid before the House of Commons, and has had a first reading.

2d, That this satisfaction has been increased by the knowledge, that the two great principles of the measure, viz. a uniform standard of education and qualification, and the abolition of all local privileges, are those, for the recognition of which, the college have on various occasions contended, and expressed the same opinion in petition to the legislature.

3d, That the principles now specified, if carried fully into effect, would confer a great benefit on the profession and the public, and would remove the evils, and remedy the abuses now existing, and of which, for a long time past, there has been too good reason to complain.

4th, That in thus providing the public with a supply of fully qualified general practitioners, the college are of opinion that government is undertaking all that can be properly attempted by legislative interference.

5th, That the college have, with regret, observed that the part of the bill which proposes to abolish the practice of prosecuting unlicensed and unqualified practitioners, has given rise to great alarm and a good deal of opposition. The college are inclined to doubt the practicability of restraining unlicensed practice by penal enactments, or the expediency of attempting to do so by such means, and in this view they are strengthened by the fact, that such powers, although vested in some of the public bodies in Scotland, have for many years been allowed to lie dormant without any practical inconvenience. But notwithstanding that these are the sentiments of the college, yet, if it shall appear that it is the desire of a large proportion of the intelligent members of the profession, to attempt to restrain such practitioners by penal enactments,—rather than endanger the final success of a measure otherwise so beneficial, the college are disposed not to urge strongly their own opinions on this head.

6th, That while the college approve most cordially of the general spirit and principles of the bill, they allow that in various details it may be desirable to introduce certain changes and modifications not affecting its principles or leading details, and which, so far from impairing the efficacy of the measure, would tend materially to facilitate its practical application.

7th, That the best thanks of the college be conveyed to Sir James Graham for the trouble and attention which he has bestowed in the preparation of this bill, accompanied by a copy of the foregoing resolutions, and an expression of the hope entertained by the college, that the measure may be, at an early period of the ensuing session of parliament, brought under the consideration of the legislature, and finally passed into a law.

R. RENTON, *President.*

Report by the Royal College of Surgeons of Edinburgh on "A Bill for the better Regulation of Medical Practice throughout the United Kingdom." (Approved of, 4th October 1844.)—The Royal College of Surgeons of Edinburgh have observed with the greatest satisfaction that the grievous impediments to the practice of the healing art, arising from the faulty state of the laws affecting the medical profession, of which the college have so long unavailingly complained, have engaged the attention of Her Majesty's advisers; and that a legislative remedy, proposed by them, has been read a first time in parliament, and has been printed for the information of all who take an interest in the subject of it.

It is satisfactory to the college to discover, that the proposed bill is based on the great general principles which they have so repeatedly urged upon the legislature as being of paramount importance and necessity—viz. uniformity and sufficiency in the amount of education required of candidates for medical qualifications; uniformity and sufficiency in the strictness of the examinations to which such candidates are subjected; and uniformity in the privileges to which successful candidates are introduced, in whatever division of the United Kingdom their education and their qualifications may happen to have been acquired.

It is also a leading and a most important principle of the bill to give to the persons thus qualified the advantage of exclusive eligibility to medical offices in hospitals and other public institutions, and to give to the public the advantage of knowing what practitioners are qualified, by the registration and publication of their names at stated periods.

It is the opinion of this Royal College that no measure of medical reform ought to be satisfactory, either to the profession or to the public, which does not embrace all these general principles, and which does not utterly abrogate those partial and exclusive rights of medical incorporations, which, in certain parts of the United Kingdom, have operated so injuriously as impediments to the selection, by the public, of well-educated medical men for the performance of professional duties for which they would otherwise have been preferred.

The college regret to find that the proposed bill has been objected to by many respectable medical men, on account of its not containing provisions for restraining unqualified persons, by penalties, from practising the profession. The college consider this matter to be subordinate in importance to the great leading features of the bill already alluded to, that neither of the two opposite views of it ought to be urged in such a way as to endanger the measure. On the point itself the college have seen no cause to alter an opinion which they expressed *unanimously*, in a report which they published four years ago; an opinion upon which they have uniformly acted for a very long term of years, "that prosecutions will be found to fail in accomplishing the object proposed," that "they may render the unqualified more cautious in practising on public credulity, without making them less successful;" that they may even impart to their pretensions

a degree of fame and of importance, which those pretensions would never acquire without such assistance, and that "they may have an unfavourable impression on the character of the qualified, who will be more likely to stand well with the unprofessional part of the public if they have the magnanimity to despise this species of artificial protection, and to rest their claims to public confidence solely upon their professional talents and qualifications." In this view the college find themselves fortified by the concurrence of Sir James Graham, of Mr Warburton, and of most of those members of parliament who have given attention to the subject. The college trust that the arguments on both sides will be dispassionately considered by the committee on the bill, by whose decision, whatever it may be, they are perfectly willing to abide.

The college farther resolved,

That the medical reform committee be authorized to give every possible assistance, by petition or otherwise, to the passing of the bill of Sir James Graham, with such alterations as may seem expedient, provided always that the great principles on which it is based are in no degree impaired by such alterations.

Report of the Trial of a Chemist for Unlicensed Practice. (Times, Wednesday, 11th December 1844.)—With the view of illustrating at this time the difficulty of proving what is called unlicensed practice, amidst evidence not by any means ambiguous, we subjoin the report of a trial which took place at the Chester Assizes, on the 9th December, before Mr Baron Gurney.

Edwin James Port, 49, chemist, of Birkenhead, was indicted for manslaughter, in causing the death of Mary Harris.

The Attorney-General, in opening the case, stated that the prisoner resided at Birkenhead, and professed to cure cancer without the application of the knife; he was, however, neither a licensed physician nor surgeon, but that made no difference in the case. The deceased, Mary Harris, resided at Wem, in Shropshire, and hearing, through the medium of an advertisement, of the prisoner's fame for the cure of the malady with which she was afflicted, she determined to proceed to Birkenhead, for the purpose of obtaining the benefit of his advice and treatment. She arrived at the place in question on the 10th of October. On the 11th she waited on the prisoner, and he applied a plaster to the breast affected, from which application she experienced great pain. He subsequently tried another plaster, to obviate the injurious effects of the first; but all was of no avail; she died on the 24th of the same month. The first question for their consideration was, whether death resulted from these plasters? and the next was, whether they were applied negligently, ignorantly, and without due caution? The law that would govern the case was laid down by Mr Baron Byles, in the case of St John Long. That learned judge said, the question for the jury was, "whether, in reference to the remedy used, he acted with due caution, or with gross and improper rashness and want of caution." That would be the question for them to try. What the plasters to which allusion had been made consisted of nobody could tell; as, when they were taken off, the prisoner took them away. The medical testimony, however, would be to the effect, that sloughing was produced, and in the *post mortem* examination it appeared that arsenic had been absorbed into the system. The deceased was interred at Wem, where an inquest was held, and a verdict returned "that the deceased died from natural causes." Two medical gentlemen at Birkenhead, however, named Vaughan and Foulkes, caused the Cheshire coroner to get the corpse disinterred, and another inquest was held, which resulted in a verdict of "manslaughter." In St John Long's case, evidence was given of successful treatment in more

than 100 cases, and he was told that a similar line of defence would be taken in this. That, however, could not avail, as they must dispassionately judge this case by itself on its own merits; and if they were of opinion that he applied the plaster which caused the death, and that he did so rashly and ignorantly, then they must return a verdict of "guilty of manslaughter," and this would be the case, if the first physician in the world were to be subjected to a similar charge. The learned gentleman then called

Mary Phillips, who stated that she was the daughter of the deceased Mary Harris. On the 10th of October witness went to Birkenhead with her mother, who was afflicted with cancer in the right breast. The prisoner was consulted on the 11th, and he applied a plaster to the part affected. Witness returned home on that day, and went again to Birkenhead on the 20th, when she found her mother very ill, but was compelled to return home on the same day. Witness did not see her alive again. The body was sent to Aston, near Wern, for interment. After burial the body was two days in the ground before it was disinterred.

Cross-examined.—Her mother was affected with cancer for two years, and had been attended during that time by two doctors, but she did not get better under their hands. She was very ill when she went to Birkenhead.

Jane Gwyn deposed, that she lived in Ivy-street, Birkenhead. The deceased came to lodge at witness's house. Prisoner came to attend deceased on the 11th of October. The deceased went to Wallasey that night and came back next morning. On the Monday the deceased became sick. She vomited and complained of pain in the stomach. She spat a good deal. She told me that she had done so before. On the Tuesday and the remainder of the week she complained of being cold in her hands and feet, and of her teeth being loose. I don't know what became of the plasters. I made a poultice on either Monday or Tuesday, and every day after. I did not see the prisoner apply anything else. On the Friday in that week I saw him apply a plaster to the right breast; it was about the breadth of the palm of the hand. The deceased was very unwell up to Sunday evening, when the pain left her. The prisoner took the plaster off on the Sunday; the appearance of the breast was the same as before. She died between 3 and 4 o'clock in the afternoon on Thursday, the 24th. No more plasters were applied after the Sunday. The deceased continued getting weaker until she died. She did not at times know what she was about on the day she died. I never saw the plasters after they were taken off. The body opened at Birkenhead was that of the deceased.

Cross-examined.—The skin was entire on the breast. There was no wound.

Dr Zachariah Barnes Vaughan.—I am a physician and surgeon, residing at Birkenhead. I made a *post mortem* examination of the body of the deceased at Birkenhead. On opening the body, it was fresh in appearance; the lungs had the air cells enlarged; the stomach was greatly inflamed and the inflammation extended to the small intestines; the lower gut was inflamed. The kidneys were both inflamed. On opening the left kidney there was a circular mark of inflammation. The liver was highly vascular. The gullet was intensely inflamed. The teeth were loose. The brain, trachea, larynx, and spleen, were healthy. On the right breast there was a slough the size of a breakfast cup, which extended an inch into the breast. I connect the internal inflammation with the sloughing of the breast by the subsequent finding of arsenic, and which would account for the inflammation. I am of opinion that these produced the mortal sickness of which the deceased died. There was a hard substance in the breast. I am inclined to think that it was not a cancerous affection. I do not think it would ever have produced death. It is not prudent to apply corrosive

substances to such an ailment; to do so would be rash and indiscreet in the extreme.

Cross-examined.—I attribute all the inflammatory appearances to the application of some corrosive substance. The appearance of the lungs might be attributed to asthma. Inflammation of the kidneys is a usual result of the application of arsenic; it also results from many other causes. All the inflammatory appearances in the body might be produced from other causes, had the arsenic not been found. I have not seen such intense soreness of throat from cold. I have never known looseness of teeth follow the application of arsenic. The sloughing could not have taken place after death. The treatment of cancer is one of the most difficult subjects to the profession. There are great doubts as to the best mode of treatment. There was an eminent person named Hill, formerly a resident in this city, who has written on cancer. He has recommended the application of arsenic, or other corrosive matter, in cases of cancer. Cooper's Surgical Dictionary is an authority in the profession. The different modes of treating cancer are specified in it. Arsenic is one of the substances used in open cancer, but it requires the greatest caution. In the earliest cases, cancers are not open. (A passage was read in which arsenic, amongst other remedies, such as conium, preparations of iron, iodine, and hydriodate of potass, may be used in the early cases of cancer.) I know that all the other substances except arsenic are mentioned in the early stages. Opium, externally applied, is rapidly absorbed by the human body. Arsenic is not absorbed very rapidly. Within the last fifteen years attempts have been made to cure cancer by destroying the parts in which it is imbedded, particularly in the French hospitals. It will, if successful, come out like a knot, and obviate the necessity of cutting off the breast. I have not always been successful in my treatment of diseases. Medicines I have prescribed may have been injurious. The application of a remedy is safe in proportion to the number of cases in which it has succeeded. Medicines once deemed quackeries are now used in the profession.

Re-examined.—The white oxide of arsenic is frequently used, in cases of cancer, by many eminent men. Arsenic is dangerous in proportion to the quickness with which it is absorbed.

Mr John Foulkes.—I am a surgeon residing at Birkenhead. I assisted in the *post mortem* examination. I conveyed to Dr Brett of Liverpool the stomach, the rectum, the liver, the breast, the spleen, &c. The breast had been separated by Mr Walsley of Wem, at the first inquest. I am of opinion that the inflammatory symptoms were produced by an irritant poison, and that arsenic had been applied by plaster.

Cross-examined.—I should have been of opinion, from the appearances alone, that they had been produced by arsenic, but I would not have sworn it. I have been in practice at Birkenhead about two years. The prisoner was then in extensive practice there.

Dr Richard Hargrave Brett.—I received the portions of the body of the deceased. I made an analysis. I detected arsenic in the breast, and minute quantities only in the tissue of the stomach, the liver, and the spleen. I did not detect any in the fluid contents of the stomach or the intestines. I infer arsenic had been received into the system by absorption through the breast. Death was caused by that absorption. I cannot give an opinion as to whether the arsenic was administered rashly and indiscreetly.

Cross-examined.—The quantity detected internally would be decidedly less than a quarter of a grain. Marsh's test did not succeed. It is not so delicate a test as the one I used. Marsh's test is more relied on than those which preceded it, because it is considered as more delicate. Orfila was of opinion that there is arsenic in the human bones. I do not know that he has altered his opinion. The substances I analyzed were brought in a white jar, and the contents of the stomach in a glass bottle. Arsenic

is used in making glass. I broke the glass tube in which the fluid was in making the experiments. I detected arsenic by that test. I detected it in the stomach, the liver, and the spleen, without breaking up the glass. No chemist would be justified in judging of arsenic in these cases without using the third test—the nitrate of silver. In cases of absorption, inflammation and pain may go on for months without producing death.

This being the case for the prosecution,

Mr Temple contended, that the indictment was in no way sustained by the evidence adduced. The objections he had to make were twofold; the cause of death was not rightly alleged, or if rightly alleged was not proved. The sore was not made out in evidence as an adequate cause of any fatal result. In the cause of "Sandy," tried at Chester in 1841, as he found in Greave's edition of Russell, the cause of death was directly described, as it stated that the white arsenic was swallowed, by means of which swallowing the party died. So in this case, it should have been alleged that death was caused by the absorption, and not solely by the sore and sickness. He next contended that no sore had been proved. The witness Gwyn proved there was no sore, therefore the indictment must fail.

Dr Vaughan recalled.—There was no ulcer, but merely a slough. The skin was entire. In common parlance a slough is a sore.

Mr Egerton followed Mr Temple, and said that the only evidence of a slough even was that of Dr Vaughan, who only found it on the *post mortem* examination. The skin was unbroken; whereas a sore and ulcer meant that the skin had been broken. The mortal sore and sickness ought to have been proved to have existed during life, and to have caused death. The cause of death ought to have been differently alleged, or have been sustained by the evidence.

The learned Baron said that one of the objections involved a nice point, but the other was quite clear. One cause alleged was, that the prisoner produced mortal sickness by the application of inflammatory and dangerous substances. That was, he thought, quite sufficient; therefore he should not stop the case.

Mr Temple asked the Court to reserve the point.

Baron Gurney.—No; I do not see any necessity to do that.

Dr Brett recalled.—I could not judge of the quantity of arsenic found in the stomach alone; that found in the stomach, liver, and spleen was less than a quarter of a grain, there was perhaps three-tenths of a grain in the breast.

Mrs Phillips and Mrs Gwyn were recalled, and concurred in stating that the deceased had for some time suffered from asthma.

Mr Temple then addressed the jury, and said he thought that it was throwing upon them a most dangerous task, to call upon them to find the prisoner guilty of a felony on such evidence as this, and thus to peril not only his liberty but his character. He adopted the propositions of the Attorney-General as to the points upon which the jury would have to decide. It was a plain matter of fact, whether or not the prisoner applied the arsenic; and he contended that on that point the evidence was defective. All that was proved was that the prisoner applied a plaster, and they were called upon to infer that that was an arsenical preparation, or some other irritant poison. The woman died, she was buried, she was disinterred; and, after the lapse of some time, an analysis took place, and the portions found were most minute, and almost infinitesimal. The learned counsel contended at considerable length that the evidence as to rash and improper treatment altogether failed, and that the medical testimony offered for the prosecution as to the cause of death was inconclusive and speculative. He dwelt on the facts that the relatives of the deceased made no complaint of the treatment of Mr Port, nor did they charge

negligence, and that an inquest had been held in Shropshire, where the jury found that she died of cancer. He contended that the prisoner's treatment was sanctioned by high medical authorities; and because the remedy had failed in one instance, they were not to brand any man with gross and culpable negligence and find him guilty of felony. He concluded by a powerful appeal, showing the want of safety to the medical profession generally, if this prosecution were sustained, as in any or all cases of failure the parties might be charged with manslaughter, and said that he should show that Mr Port's treatment had been successful and satisfactory for a very long period, and amongst a large circle of patients.

The learned gentleman then proceeded to call twelve witnesses in succession, who severally swore that they had been afflicted with cancers and tumours, which had been subjected to the treatment of regularly received medical practitioners without any beneficial effect, but that the prisoner had cured them, with only two instances of anything approaching to the effects produced on the deceased; namely, sickness, and the minor symptoms observable in her case.

After a reply of some length from the Attorney-General,

The learned Baron, in summing up, said that if the prisoner had, in the practice of surgery, without sufficient skill and knowledge, and without due care and attention caused the death of the deceased, he was guilty of manslaughter. The evidence showed that he applied only two plasters, and subsequently poultices. The latter were undoubtedly innocent; and consequently the irritant substances were in the plasters; of what they were compounded they knew not. They could only judge of them by their effects, and the *post mortem* examination. The inquest in Salop was illegal, and the coroner who held it was grossly ignorant of his duty, for inquests must be held where the cause of death occurred. He then commented at length on the medical and scientific evidence. The quantity of arsenic was exceedingly small. It was not that found which caused the death, but that absorbed into the system. Did the evidence convince them that the prisoner had, without due knowledge and caution, applied an irritant poison to the deceased's breast? Twelve persons had been called whom the prisoner had successfully treated, but in those cases the effects had in only two cases been similar to the symptoms before death in the deceased. In these two cases there had been vomiting. If they were of opinion there had not been due knowledge and caution, then they must find the prisoner guilty.

The jury, after a short consultation, retired, and after an absence of about forty minutes returned a verdict of *Not Guilty*, which was received with a simultaneous burst of applause. One respectably attired person, who was rendered conspicuous by the loud clapping of his hands, was taken into custody by order of the judge.

The learned Baron then addressed the prisoner, warning him to take care of himself for the future, as he might not be so fortunate another time.

The result of a trial, such as that now detailed, ought to satisfy any reasonable person, that it is difficult, if not impossible, to obtain a conviction in any given case of alleged unlicensed practice. Here is an instance, in which a woman is put to death by the application of an irritant poison; and, amidst evidence as clear and certain as it is ever possible to obtain, the jury return a verdict of not guilty. It is certain that the cause alleged was quite sufficient to produce death; it is equally certain that death could not have been produced in any other way. It is well established that arsenic applied in the manner, in which it was applied to this woman's breast, is known to be absorbed and to produce its usual effects. It is also true that at least, since the time of Justamond, no sensible surgeon ever thinks of

applying arsenic in the manner here done, in consequence of the danger of producing the very result, which had taken place in this case. Yet amidst all these well established facts as to the impropriety of the practice, the jury is induced to find the prisoner not guilty. Nay, so great a favourite is this unlicensed chemist with the public, that the audience rejoice that he is pronounced not guilty. We have no doubt that the result of this trial will make him more popular than ever; and that many persons with cancers, and without them, will give him an opportunity of applying the arsenical plaster. The warning of the judge will be of no avail.

Results of American United States Experience as to the suppression of Unlicensed Practice by legislative measures and penal enactments. (*Transactions of the New York State Medical Society*, Vol. VI. Part I., Albany, 1844.) Report of a Committee on the Subject of Medical Legislation to the Monroe County Medical Society (p. 37).—In the article on Medical Reform, we have endeavoured to show how very impracticable and inefficient must be any legislative attempts to abolish unlicensed practice, from the habits of society, the constitution of the human mind, and the natural desire in cases of pain and suffering to obtain relief. In America the attention of the profession has been also directed to this subject. A committee appointed to inquire into this matter, presented to the Monroe County Medical Society, Rochester, on the 9th November 1842, a Report, from which it may be proper to make one or two extracts.

In Vermont it is said a law was passed in 1821, to the effect,—“No person shall be entitled to the benefit or privilege of law for the collection of his or their fees, unless they have received the degree of M. D. or A. B. in some academy, college, or university, within the state or elsewhere, having authority to confer such degrees. This law did not prevent their practice, but they did not have the benefit of law for the collection of their debts. Quacks were left at the mercy of their employers, who would pay them or not, just as they chose.

“In 1835 the quacks, together with their friends, petitioned the legislature to repeal the act of 1821, saying it was an unjust law—‘that the labourer was worthy of his hire’—that if individuals would employ them, they were entitled to pay for their services and medicine; but their petition was not granted. In 1836–7, they again petitioned, but with no better success. The sympathy of the people seemed to move with these ignominies, and in 1838 they petitioned the legislature, and obtained their request, on the principle that if an enlightened community has a disposition to employ them, let the quack have law on his side. I think the abolition of this law has had a very salutary operation in the suppression of quackery through this region. We have not had a quack in this town for nearly three years past; the eight years previous we had one here constantly.”

In South Carolina it is said, respecting the act of 1838 repealing the act of 1817, Dr Ramsay says, “‘I do not think it has had any effect on the increase or decrease of quackery.’ Dr Logan, however, seems to be of a different opinion. He says, in 1838, the success and encouragement in secret murdering, met with by the steam doctors and their coadjutors, emboldened them to make a formal application to the legislature, for a repeal of all the laws regulating the practice of medicine. The question was a popular one, and the enlightened members of the legislature, fearing to risk their popularity, by opposing such an insult to the highly enlightened medical community of South Carolina, actually voted for, or sanctioned the repeal of every law hitherto restricting the practice of the physician, surgeon, and apothecary, to properly qualified and authorized persons, and allowed every old woman, savage Indian, or Guinea negro, that chose to start up and call themselves doctors, surgeons, or apothecaries, ‘to rise, kill, and slay.’ The consequence was, that the name of doctor became as common on the door posts as bell handles. Apothecary fancy stores multiplied ad infinitum.”

In Indiana, Mr Davis states, "I am unable to say that empirics are more numerous now than when we had a law restraining them, taking into calculation the great increase of population within the last fifteen or twenty years."

In Ohio the following account is given.

"To our first inquiry, Dr Charles C. Hildreth of Zanesville replies—'That at present no such law exists. The consciences of our citizens are left perfectly untrammelled in matters of physic as well as divinity. The law makes no invidious distinctions between the quack and the physician. The cobbler who sits all day and hammers sole leather, *when not professionally engaged*, and whose library consists of a single treatise by Thomson, (which, in point of size, would not make a respectable monograph on Hemorrhoids,) is by law entitled to all the privileges and immunities of the M. D., who has walked the hospitals for seven years in Europe, and devoted a lifetime to the science of medicine. You may call this carrying out the democratic principle somewhat liberally; so indeed it is. In the state of Ohio, there is no distinction of rank in the profession of medicine.'

To our second interrogatory, he says, "An act to incorporate medical societies, for the purpose of regulating the practice of physic and surgery in this state, was passed Feb. 26, 1824. This act imposed penalties for practising medicine without a diploma or license from the state medical society—nor could any one, without such authority, collect his fees for medical services by law. This act was repealed Feb. 25, 1833, since which time we have had no medical law in force. The only resource now left the public against the destruction of health and life by quackery, is an action at law for damages, on a plea of mal-practice. Such actions are frequent, and fines and penalties sometimes severely inflicted.'

"To our inquiry, 'What influence has the abolishment of such law had upon the increase or decrease of quackery?' he says, 'As far as my observation extends, the repeal of all law on the subject has had a tendency to diminish the number of quacks among us. This has certainly been the result in the town of Zanesville and its vicinity. During the existence of our medical law, the quack cried out to the people, that he was an oppressed and persecuted man; that if the law would extend to him the privileges granted the physician, he would convince the people of the superior efficacy of his remedies and the wonderful success of his practice. This argument, however fallacious, had its influence with the ignorant. The repeal of this law at once robbed the quack of his strong hold on the sympathies of the public, and left that public unbiassed in its judgment of his merits, and the comparative success of his practice. The absence of all medical law has, however, tended very perceptibly to put down the standard of professional excellence among the regular faculty. Hundreds of men enter the profession in our state, who are wholly unqualified to practise, both by previous education and gross ignorance of medical science. Hence the appellation of doctor is in many instances anything but a term of honour. The facilities for getting diplomas from our medical colleges are much too great for the good of the profession. Medical colleges are, in this respect, positively dishonest. From pure mercenary motives, and for the express purpose of increasing their classes, they suffer hundreds to take a degree, who, they are perfectly aware, are unworthy. These things require reform. The question is, how is this to be effected? Much advantage would no doubt arise from increasing the term of study, to something near the term required by law in the most enlightened portions of Europe. Another measure having the same tendency will be to take from medical colleges the power to confer degrees, and give it to a state central board of scientific men."

The following extract contains the general result of the whole.

"From the facts thus adduced, it appears, that *eight* of the states have

never had any laws regulating the practice of medicine; that *ten* have abolished all law on the subject; that *four* only have any existing law, so far as is known to us, (for from the four following we have received no replies to our circulars—viz. Arkansas, Illinois, Michigan and Delaware.) So that *eighteen* at least out of the twenty-six states have at this time no laws regulating the practice of medicine, nor prohibiting that of quackery.

"With regard to the benefits to be derived from legislation, in the matter before us, the testimony here adduced is somewhat discrepant, both as it regards the facts, and the opinions of the witnesses. But one thing is clear, viz. that quackery and patent nostrums every where abound, despite all law and the severest penalties. It is also equally evident that public opinion will not tolerate penal enactments prohibiting empiricism. The committee have, therefore, unanimously come to the following conclusions:—

"*First*, That in the present state of the public mind, all penal or prohibitory enactments are inexpedient.

"*Second*, That it is most conformable to the spirit of our civil institutions, to have perfect liberty to all to practice medicine, being amenable only for injury done.

"*Third*, That all legislation relative to the practice of medicine and surgery, as in all other arts and sciences, should aim to encourage, by affording such facilities as may be necessary to its highest prosecution.

"*Fourth*, That the important, if not the only remedy against quackery, is medical reform, by which a higher standard of medical education shall be secured."

This is the result of experience in the country which is believed to enjoy freedom in all her institutions in the most perfect form. Whether high education of the profession, or education of the public will extinguish unlicensed practice and quackery, it is not easy to say. But it is clear that legislative enactments and penalties never can.

Edinburgh, Nov. 1844.—THE professional friends of DR ABERCROMBIE, entertaining a strong desire to express, by some public memorial, the respect and affection in which he was held as a physician, a philosopher, and a man, by the whole medical profession, have requested the following committee to determine in what manner these wishes could be best carried into effect.—ROBERT RENTON, M. D., President to the Royal College of Physicians; JAMES SIMSON, M. D., President to the Royal College of Surgeons; PROFESSOR CHRISTISON; PROFESSOR SYME; PROFESSOR TRAILL; SIR WILLIAM NEWBIGGING; DR MACLAGAN; HENRY MARSHALL, Esq., Deputy Inspector of Army Hospitals; ALEX. COCKBURN, Esq., Surgeon, R. N.; GEORGE SMYTTAN, M. D., H. E. I. C. S.

The Committee having met on the 25th November, resolved,—

1st, That the wishes of Dr Abercrombie's professional friends would be best fulfilled by placing in some appropriate public situation—to be afterwards fixed upon by the subscribers—a MARBLE BUST of their deceased friend, to be executed by Mr Steele, who is fortunately in possession of the necessary materials for producing an accurate likeness.

2d, That, to carry out this object, subscriptions shall be immediately commenced, and that the Medical Profession in Scotland be invited to contribute.

3d, That DR RENTON, 26, Howe Street, be appointed *Treasurer*, and DR SIMSON, 10, Hope Street, *Secretary*.

THE
EDINBURGH
MEDICAL AND SURGICAL JOURNAL.

1. APRIL 1845.

PART I.
ORIGINAL COMMUNICATIONS.

ART. I.—*Report upon the Tables of Deaths in the Census of Ireland for the year 1841.* By WILLIAM ROBERT WYLDE, Esq.

[THE present Report is a Commentary on the Tables of Deaths published in the Census of Ireland taken in 1841. It contains a considerable amount of information on the diseases most prevalent in Ireland, and especially on those which contribute to its mortality. As this information appears to us to be interesting, and as it presents all the appearances of accuracy, and of having been collected with great care and attention, and, above all, as the volume in which the Report is published is not very accessible, we think that professional readers will be pleased to see it published in a separate form in such a manner that it may be easily and extensively studied.]

The total population of Ireland for 1841, to which the following report applies, amounts to

		Proportion of the Sexes.
Males,	4,019,576	100
Females,	4,155,548	103 $\frac{1}{10}$
Total,	<u>8,175,124</u>	

No. 1. SMALL-POX.—The time at which this disease first made its appearance in Ireland has not been, as yet, fully determined. It must have been in existence long prior to the date of the English and Latin authors of the 16th and 17th centuries; for the Irish manuscripts refer to it in the beginning of the 15th century; it is

described in the book of O'Shiel under the name of *Bolgach*, which means literally blisters or pustules containing matter; but water-blisters (vesicles or bullæ) are generally termed *Clog*. One of the Irish translators in the 15th century states, that small-pox and measles (which, in the manuscripts, are generally mentioned together,) form in pustules all over the body, and are generated from a vitiated state of the red blood and humours, but that the small-pox is produced from a vitiated state of the red blood alone, and measles from a depraved condition of the humours. The work of Bernard on the Small-Pox and Measles, is mentioned in the book of O'Shiel, (see Manuscript, No. 214.) Although the term *Bolgach* is known to all Irish scholars, and the better classes who speak the native language, yet among the lower orders, particularly in the western district, the word *Galar Breac*—the speckled disease—is frequently applied to small-pox. In the early manuscripts, however, where that term is used, it is meant to express freckles or *Breicnidhe*. But from the following passage, '*Lentigines sunt infectiones cutis, faciei quamplurimum et aliquando cutis totius corporis*,' it would seem that this was an affection different from that with which we are at present acquainted. That the *Galar Breac* is not the proper Irish term for small-pox, may be inferred from the circumstance of the word being employed in the earlier Irish records (principally the satirical poems) long prior to the period at which we may suppose that that disease appeared in this country. As this term is likewise applied to *Purpura*, it may be, in that sense, that the early Irish authors looked upon it as infectious. Dr Rogers, when describing the small-pox as it appeared in the south of Ireland at the commencement of the last century, says, 'This distemper, though of foreign growth and by transplantation brought in amongst us, is now become a weed of our own soil, and a native of our own country. It is well known that it came from Arabia, and that it can claim no longer a descent with us than about two centuries.' This accords well with the date of the first MSS. in which it is mentioned. The same author records an epidemic of this disease at Cork in 1708, 'of the most crude and worst kind, that swept away multitudes;' and notices the annual return of small-pox from 1718 to 1721, and from 1728 to 1731. The epidemic of 1719 and 1720 is also noticed by Dr O'Connell in his chapter '*De Variolis benignis et anomalis constitutionis annor. 1719, 1720*,' &c. In a few of the returns, particularly from some of the southern districts, deaths were returned as having occurred from 'Cow Pock;' that these were deaths from Variola there can be little doubt, the error in the nomenclature having arisen either with the enumerator, or in translating the Irish term into English. Among the purely Irish population two terms are employed to express small-pox, varying only according to the mode of its propagation. Thus, when it appears spontaneously, it is said to be *Bolgach De*, or God's Pock, or the Natural Pock; and when from the effects of inoculation, *Bolgach Doctura*, the Doctor's Pock.

The total number of deaths from this cause during the ten years amount to 58,006 in the proportion of 100 males to 96.45 females; and as the characters of this disease are perfectly well known to all

the inhabitants of this country, it may be safely inferred, that although this number may not include *all* who died of that affection, yet the deaths specified under this head do not include those from other diseases. The proportion of this to the general mortality appears from the returns to be 1 in 20·46, and compared with all of the epidemic class, 1 in 6·57, being (next to fever) the most fatal epidemic affection in this country.

According to the census returns the mortality from small-pox is about one-half that of fever; but as far as the records of this disease afford information, the proportion of these two diseases appears to have altered considerably; for according to the accurate observations of Dr John Ritty, we learn that 'the small-pox raged in Dublin in January and February 1728, a somewhat frosty winter, after a wet summer, and that year there died of the small-pox nearly one-half of the numbers that died of the article called fever. In 1736, when there was a very hot summer, the article of small-pox was nearly double to that of fever; even a far greater proportion of the first to the last than usual. In 1740, an uncommonly dry season, they were very fatal in summer, being sometimes double, sometimes treble to the article of fever, and in the general considerably exceeded the article of fever. In 1743, in August, September, October, November, after a hot and dry summer, they prevailed again, though to a less degree, but they exceeded the article of fever in the months mentioned; and again, in July, August, September, October, 1745, in and after a very wet summer, they were remarkably malignant, sometimes above double to the article of fever; and lastly, in summer 1752, which was an extremely wet one, they sometimes exceeded the article of fever. And it is observable that the sum total of persons who died of the small-pox in Dublin during one-and-thirty years, was but little short of that of the article fever; the number of fevers during that time, according to the Bills, having been 16,081, and of the small-pox, 13,759, a large proportion truly, and what abundantly proves the expediency and high importance of the practice of inoculation.'

How much small-pox must have decreased in the city of Dublin may be learned from the fact, that notwithstanding the vast increase of population during a century, the average proportion of deaths for 10 years from this cause, is barely one-half in the present day what it was in the middle of the last century. The years in which it prevailed most were 1837 and 1838.

It is to be lamented that some earlier diffusion of the blessing of vaccination had not been attempted among the lower orders of this country, thousands of whom still employ the old method of inoculation with variolous matter, and by which means not only are many hundred deaths produced, but the disease is still propagated in the kingdom.

This fact is borne out by the circumstance of the greater mortality from this cause occurring in the province of Connaught and part of Ulster, where, until the passing of the recent Vaccination Act, and even still, individuals proceed from village to village seve-

ral times during the year for the purpose of *inoculating* the infantile population.

In Leinster its proportion to the entire mass of epidemic diseases appears to be 1 in 8·9 ; in Munster, 1 in 6·6 ; in Ulster, 1 in 5·96 ; and in Connaught, 1 in 5·35. In the metropolis it is 1 in 13·79.

In comparison with the general mortality from all other causes it has prevailed most in the counties of Sligo, Clare, Mayo, and Galway (town of,) and in proportion to their epidemic diseases, it has been most fatal in Clare, Sligo and Mayo.

It is remarkable that, in proportion to the general mortality, small-pox has proved most fatal in the country parts, while fever has principally raged in towns and cities, although the same influences tended equally to the propagation of both diseases. This fact still further proves the great importance of an extension and general adoption of vaccination in this country, for it is chiefly in the rural districts where the natural pock is still maintained.

Although this disease has spared no age from one month to ninety years, at which latter age one death is recorded, yet its most fatal period has been the first and second years. From one month to two years the deaths of the males predominated ; from the second to the end of the fifth year those of the females ; from the fifth to the end of the fifteenth the sexes are nearly equal ; and from that upwards the males are again in excess. It is remarkable, that with the exception of Asiatic cholera, two or more epidemics have generally prevailed in Ireland at the same time ; and that from the earliest periods to which authentic records refer. ‘ Three things,’ write Drs Barker and Cheyne, in their account of the terrible epidemic fever of 1819, ‘ are further observable in this great epidemic ; namely, that in 1740, in which year it began, the mortality caused by the small-pox in Dublin was sometimes double, sometimes treble, that of fever ; and it is notorious that in many parts of Ireland the mortality from small-pox was greater in 1817 than during any year since the cow-pock inoculation was introduced ; 2dly, an epidemic catarrh appeared early in the summer of 1743, a disease which was remarked in the end of spring, 1819 ; and lastly, the ulcerated sore throat described by Fothergill, prevailed in Ireland in autumn and winter, and was very malignant and fatal to children, particularly in the country. This is the more worthy of observation, as some cases of sore throat appeared in June and July 1819, a considerable number of which had a fatal termination ; and scarlatina now (October 1819) frequently occurs among children : hence it seems not improbable that the more closely we examine the progress of epidemics the more uniformity we shall discover in the order of their succession.’

The annals of disease afforded by the census returns present similar results ; for small-pox raged with the greatest violence in 1837 and 1838, years also marked by the prevalence and mortality of fever, measles, and influenza ; but the same causes of public calamity, as want, or distress of any kind, conduce equally to the propagation and spread of *all* epidemic diseases of a truly infectious nature.

The deaths from small-pox announced by the public hospital returns are only 129 in 10 years.

The nature of the census returns of deaths, and the information they afforded, do not enable me to record the seasons at which this or any other epidemic prevailed, nor the peculiar condition of the atmosphere or the temperature, that may have influenced or accompanied them.

NO. 2. MEASLES.—The deaths from this cause amount to 30,739, in the proportion of 100 males to 96·12 females. Although this is an affection whose symptoms are tolerably well known to the people, yet, from the interval of time that had in many instances elapsed between the deaths and the period of the census inquiry, and also from the similarity of other eruptions, as Varicella, swine pock, and several of the minor exanthemata that occasionally prove fatal to youth, it is very possible that deaths from these causes may likewise have been enumerated under the title of Rubeola.

Miliary eruptive fever, *Bruith Idhain*, (the heat or eruption in childbed,) is more likely to have been returned under this head than that of any other casualty except parturition.

The Irish term of *Bruitineach*, (the boiling disease,) is an apt expression; it is that by which the affection is still known to the people without any other Irish synonyme;—it is seldom used in the MSS., but will be found in that already quoted in the foregoing disease, and bearing date about the beginning of the 16th century, which is the first notice of this disease that I have been able to discover in any of the Irish records. Measles do not often occur in the writings of Irish authors; they are enumerated by Petty in his Bills of Mortality for 1681, but no violent epidemic from this disease is related, except that by Dr O'Connell, in Cork and its vicinity, in 1722. In K'Eogh's Short Treatise of the Diagnostic and Prognostic Parts of Medicine, in 1739, he says, 'they, *Sudamina rubæolæ*, are seldom dangerous if due care be taken in the beginning, nor do they continue many days.' Ruttty, and the writers of his day, notice them frequently in the early part of the 16th century, but chiefly as an endemic disease. In comparison with other epidemic diseases, particularly hooping-cough and small-pox, this affection destroyed greater numbers in the civic than the rural districts, for considerably more than a third of all the deaths of this kind occurred in the towns of 2000 inhabitants. Only 38 cases are returned by the hospital reports. Compared with all diseases, the deaths from this cause amount to 1 in 38·62, and with all the epidemic affections 1 in 12·4, being the sixth most fatal disease of this class. With the exception of the year 1840, when 4991 deaths from this cause are returned, measles have presented the most remarkable uniformity throughout the entire period.

The age at which this disease has proved most fatal was from birth to the end of the first year, when the sexes were 100 males to 86·74 females; from the first to the end of the fourth year, 100 to 100·04; from the fourth to the fifteenth, as 100 to 100·57; from the fifteenth to the thirtieth, 100 to 138·76; and after thirty, as 100 to 161·81. The most advanced ages at which this disease proved

fatal were, one male from sixty-five to seventy, and one female from seventy-five to eighty. The proportionate mortality from this disease varied in the provinces, in the following order, viz. Munster, Connaught, Ulster, and Leinster; and, in proportion to the general mortality, it has prevailed most in the counties of Kerry, Roscommon, Leitrim, and the city of Cork.

NO. 3. SCARLATINA.—The tenth most fatal affection of the epidemic class of diseases, destroyed 7886 persons, the sexes being in the proportion of 100 males to 95·97 females. With the exception of cholera, this disease has proved more fatal in towns, and among large and closely united masses of the population, than any other epidemic of this country, being 1 death in 24·63 of the epidemic affections of the civic districts, and but 1 in 65·07 in those of the same class in the rural districts, or open country. The deaths specified from this cause are in the proportion of 1 in 150·56 of the total recorded mortality, and 1 in 48·84 of the entire epidemic or contagious diseases; but, as the symptoms of redness or eruption are not always present (particularly of late years, and in the more malignant forms of this disease), I do not think the entire number of deaths from scarlet fever have been returned under this head; some, perhaps, may have been entered as measles, a disease with which, in its milder forms, it has frequently been confounded; and others, under the head of disease of the throat, putrid sore throat, (*Angina Maligna*,) being frequently the most prominent, and at times the only symptom. Sub-acute dropsies, the sequelæ of scarlatina, where such occurred, have no doubt been included under the head of dropsy.

In the years 1835 and 1836, and part of 1837, the mortality from this disease rose from 620 to 840, 1074, and 1043, being then the forerunner of the fever and small-pox which prevailed in 1837, 1838, and 1839, during the continuance of which diseases it fell, but again rose on their decline in 1840.

Provincial comparisons, and those for counties, have not the same value attached to them in this as in other diseases, whose symptoms are better understood by those who filled the returns; in Leinster, where the disease is well known, its proportion to the total is 1 in 62·47, in Munster, 1 in 232·82, in Ulster, 1 in 325·82, and in Connaught, 1 in 862·27. Only 75 death from scarlatina occurred in the public hospitals. Its ravages have included all ages, from 1 month to 85 years, when one male death occurred; during the early months of the first year it has not been as destructive as other epidemics, its most fatal period being from the first year to the tenth, when ten-elevenths of the total died. During the first year the sexes were 850 males to 721 females, from the 1st to the 15th, 2958 males to 2917 females, from the 16th to the 20th, 89 males to 111 females; and from 21 upwards, 125 males and 111 females.

The records of epidemic outbreaks of this disorder are particularly deficient; the disease not having been properly described till the middle and towards the end of the last century, any allusion to it in the Irish manuscripts could not have been expected, and the Gaelic name for it, *Fiabhrus Dearg*, the red fever or redness, that by which it is most commonly denominated by the lower orders, is but a translation

of the English or Latin terms. It is not mentioned by the writers of the 17th century. Dr Rogers, in his account of the endemial epidemic fever of Cork and its vicinity, says, that among the typhus fevers that were prevalent in the year 1808, some were characterized in addition to the usual febrile excitement by these symptoms. 'An universal *petechial efflorescence*, not unlike the measles, paints the whole surface of the body, limbs, and sometimes the very face; this appearance is very general, in some few about this state of the fever, appear interspersed *eruptions, exactly like the pustulæ miliaræ, filled with a limpid serum*. The earlier these petechiæ appear, the fresher in colour, and the longer they continue out, the better. The happy issue of the disease very much depends on the three last-named circumstances. The fixed pain of the head increasing gradually, terminates commonly in a coma or stupor, or in a delirium with some, and in others with neither. In some few hath appeared a hæmorrhage at the nose, a *severe cough and sore throat*; but these seem not to be the genuine offspring of this fever, but rather the effect of some irregularity in the non-naturals, either previous to or consequent of the fevers already formed. In some few and but few have appeared purple and livid spots exactly circular, not unlike those observed in the most mortal kind of small-pox, some as large as a vetch, others not bigger than a middling pin's head, thick set over all the breast, back, and sometimes the limbs.' And in the epidemic of the year 1781, the same critical observer details the history and symptoms of three cases of fever; in one of which the skin 'was all over painted as with the measles, and here and there purple spots.' In the second, 'the previous symptoms and the laborious breathing, with a more than natural dulness and stupidity, made it plain to the knowing that there was the common fever then raging, to deal with, attended with a *red efflorescence all over the skin*'—both proved fatal, in the third there was a '*red efflorescence which became vesicular, and then seemed to go off by scaling, leaving a roughness on the skin*.' 'From 1721 to 1728 this fever was little heard of, but from that year has every year visibly gained ground, and seems to have been this last winter (1734) at its full height.' The affection thus described has been generally quoted as the maculated or true typhus of this country. May not, however, some of these cases which were attended with a red efflorescence like measles, subsequently scaling off, and others taking on the appearance of *pustulæ miliaræ*, and accompanied by sore throat, have been instances of scarlet fever occurring among the ordinary typhus, from which he acknowledges they were somewhat different?

The first distinct notice of scarlatina that appears in any Irish work, is what may be inferred from the following passages in Rutty's Chronological History of the Weather and Diseases, &c. of Dublin. 'Besides the sore throats endemial to this country, there have raged this autumn and winter (1743 and 1744,) having begun in summer, and which was not extinct for many years after, an epidemic disease which might pass under that general denomination, but of a species wholly distinct, being very malignant and fatal to children, and eluding the skill of physicians. It raged in some of the neighbouring as

well as remote counties, particularly in the counties of Wicklow, Carlow, Queen's county, Kilkenny, Cavan; Roscommon, Leitrim, Sligo, and perhaps many others, carrying off incredible numbers, and sometimes sweeping away the *children* of whole villages in a few days.' Rutty acknowledges its similarity to the *angina maligna* or *carbunculus anginosus*, afterwards described by Fothergill in 1748, and says, 'It is probable that we had this disorder here as early as we have any accounts of malignant sore throats in England.' He likewise affords us the evidence of Dr Short, upon the similarity of the affection in England in 1745, to that observed in this country, which still further confirms the identity of this epidemic with the severer forms of scarlatina, which, in 1759, 'returned again in a violent epidemic, contagious, and fatal manner, and besides others, cut off whole families of children. It was attended by a brisk fever, followed by diarrhoea, swelling of the tonsils, œdema of the face; then eruptions like the measles broke out all over the body;' death occurred from the 9th to the 11th day, 'when the sick died, as it were suffocated by the deluge of phlegm which had fallen upon the tonsils, uvula and larynx: none had a peripneumony. In some there was an efflorescence on the skin like the scarlet fever, and these recovered.' This is the earliest record of the term scarlet fever that I find in Irish writers. It was then frequently confounded with croup and the *morbus strangulatorius* described by Dr Starr. But what adds weight to the supposition of scarlatina being the disease described by Rogers, is that Rutty quotes Short as an authority upon the malignant sore throat in England in 1744 and 1746, when 'it was attended with putrid fever and petechiæ.' In 1752 he notices a 'pestilential angina,' similar to that which appeared nine years before. In the spring of 1758 a 'fever was frequent which seized chiefly young girls, and terminated in a few days with *erysipelatous eruptions* all over the skin.' In 1759, besides the measles, the scarlet fever which had infested the autumn still continued. In 1762 a similar epidemic outbreak of this disease took place. All these records confirm the fact of the existence and epidemic and fatal nature of scarlatina in Ireland in the middle of the last century, since when it has remained endemic in the country, occasionally becoming epidemic, and remarkably destructive, particularly among the upper ranks of society, whole families having been swept off from its attacks during the last ten or twelve years. Dr Tuomy records an epidemic scarlatina in Dublin in 1798;—Drs Cheyne and Barker notice an epidemic of scarlet fever in 1799 and 1800, particularly prevalent in Waterford and its vicinity.

The annals of the Sick Poor Institution in Meath Street, established in 1794, and where above 10,000 of the poor in the Liberties and most unhealthy parts of this city are treated annually, record an epidemic of scarlatina of 'a truly malignant form,' in 1807, and notice a similar return of the disease in 1834.

Dr Graves, upon the authority of Dr Percival, writes, that 'in the year 1801, in the months of September, October, November, and December, scarlet fever committed great ravages in Dublin, and continued its destructive progress till the spring of 1802. It ceased in

summer, but returned at intervals during the years 1803 and 1804, when the disease changed its character; and although scarlatina epidemics occurred very frequently during the next 27 years, yet it was always in the simple or mild form.' In 1831 it again assumed an inflammatory and epidemic nature, which increased till the year 1834, during which, and the three following years, its fatality was most marked. The popular terms of scarlatina and scarlet fever are generally used to express degrees of intensity of this malady, or according to the predominance of the symptoms of eruption, or of sore throat.

No. 4. HOOPING-COUGH,—The fifth most fatal disease of the epidemic class, carried off 36,298 persons, the sexes being 100 males to 115·43 females. The great bulk of the mortality from this disease occurred within the first year, when 10,293 male, and 11,032 female deaths are registered; from the first to the end of the fifth year 5430 males and 6968 females; from the fifth to the end of the fifteenth 1084 males and 1408 females; and from that upwards, 40 males and 40 females have been returned. From 60 to 75, two female deaths from hooping-cough are recorded. It has proved most fatal in the rural districts, being there in proportion to all other diseases, 1 in 30·48, and to those of the epidemic class, 1 in 9·09; while in the civic districts it is 1 in 36·76 of the deaths from all other causes, and 1 in 14·04 of those denominated epidemic or contagious. Its general mortality, in comparison with all other affections for the entire kingdom, is 1 in 32·71, and of the total epidemic diseases, 1 in 10·5. Only 26 deaths from this cause occurred in hospital. In the metropolis this affection was to the total epidemics 1 in 17·47. In the province of Leinster, 1 in 12·24; in Munster, 1 in 11·24; in Ulster, 1 in 9·4; and in Connaught, 1 in 9·1. Compared with their total deaths it has prevailed most in the counties of Leitrim, Sligo, Mayo, Cavan, and the town of Belfast.

This disease appears to have been a native of this country from the earliest period to which medical works refer. At the present date it is always endemic in the kingdom, but seldom assumes the character of a general epidemic, its attacks being mostly local, and therefore the returns present a more remarkable annual uniformity than those of any other of the fatal epidemics, and preserve the proportion of sexes nearly the same throughout the entire period, a circumstance that adds considerable weight to their accuracy. A slightly increased mortality occurred in the females in 1838 and 1839. Hooping-cough is a disease of such general well-marked characters that the returns as far as they go may be relied on. It is possible, however, that some cases of bronchitis may have been mixed with them.

No. 5. CROUP,—The fourth most fatal epidemic affection, carried off 42,705 in the proportion of 100 males to 82·89 females;—thus reversing the circumstance of the sexes in the preceding disease. It has prevailed chiefly in the rural districts in proportion to their general mortality. The registries of this disease afford returns of death up to the adult age, even so high as 30, and one at 40. This is the first disease we meet with where the registries of ages seem

at first sight to detract somewhat from the value of the returns, for 2965 deaths are recorded from the 6th to the 30th year, an age at which the true croup is, in the opinion of most medical authorities, not to be met with. Yet, although this is an affection almost peculiar to infancy, and the very early periods of life, it is by no means uncommon from the fifth to the tenth years, during which period the number of deaths registered from croup, amounts to 1316 males and 1292 females; these may likewise, however, include many other acute and inflammatory affections of the throat and windpipe, returned under the name of quincy or squinsey, the general English terms used by the people for all these diseases characterized by dyspnoea attended with wheezing or any bronchial or tracheal *rals*; thus in the returns, 'died of a choking,' was a frequent reputed cause of death in the years of early life. True croup is, however, a tolerably well known affection among the lower orders, and the Irish term *Tachtam sgornaigh*, the choking in the throat or windpipe, a disease of early life, is different from *Galar na sgornaigh*, which is applied generally to affections of the throat or neck either externally or internally. From the tenth to the fifteenth year inclusive, 290 deaths are recorded during the ten years, a number that may possibly still include many cases of croup. From the 5th to the 30th year, 67, and from the 36th to the 40th, 1 female has been returned; these may have been cases of croup laryngea, oedema of the glottis, *diphtheritis*, or other diseases of the air passages or even the lungs. This is not the place in which to discuss the question of the latest age at which croup may occur, nor whether this term is to be applied to the tracheal affection of infancy only, or to other inflammatory diseases of the windpipe, attended by a crowing or stridulous noise and an exudation of plastic lymph. Such cases are, however, on record. It is more than probable that cases of the croup-like affection or 'spasm of the glottis' described by Sir H. Marsh, were enumerated under the head of convulsion, from that being one of the most prominent symptoms.

It is a very remarkable feature in these returns, and what tends to strengthen the validity of the large majority of them, even after the usual age assigned to this disease, is the preponderance of the male over the female deaths at *all* ages. A question arises from this apparent error of the returns after the tenth year as to the epidemic nature of the deaths then recorded; were, however, the deaths from croup placed among the sporadic affections under the diseases of the respiratory organs, as arranged by some nosologists, this source of error would not appear so manifest. With the exception of convulsions, marasmus, and small-pox, more deaths from this disease have occurred during the first month than in any other affection specified in the census returns. Compared with other infantile diseases, the deaths during the first year are 100 to 48.29 of measles, 100 to 6.82 scarlatina, 100 to 92.62 hooping-cough, 100 to 4.98 thrush, and 100 to 60.01 pemphigus.

Croup has prevailed more in the rural than in the civic districts, as 40 of the former to 27 of the latter.

Compared with the diseases of its own class in the entire kingdom, it appears to be one death in 8·92, and with the general mortality 1 in 27·8, which in the provinces varies as 1 in 29·17, in Leinster; 1 in 23·41 in Munster; 1 in 16·96 in Connaught; and 1 in 74·1 in Ulster. There is but little diversity observed in the returns for the ten years specified; for how long it has been endemic in the country the annals of disease do not afford information. Its epidemic attacks have been principally local, and no general outbreak of this affection has been recorded. But 38 cases have been afforded by the hospital returns; the age of one of them is reputed to have been from 25 to 30.

No. 6. THRUSH—Is said to have caused death in 1480 instances; 100 males to 116·05 females, being one death in every 802·27 of the entire mortality; and although this may not be an unfair proportion of deaths from this cause, yet some of the returns of ages are similarly circumstanced with those of the foregoing disease;—1147 deaths are returned in the first year—300 from the first to the fifth—32 from the fifth to the fifteenth—and 1 female death is recorded at from thirty to thirty-five.—Aphthæ, so frequently a symptom of advanced disease, at all ages, may here warrant the return of deaths from that cause. Several of the vesicular eruptions of childhood receive the name of thrush, as well as blisters and white blisters in the mouth; cases of *Cancrum oris*, infantile erysipelas, the swine and chicken pox, and the various eruptive fevers peculiar to very young children, and generally denominated by the country people *Gums*, as the *Red* and *Yellow Gum*, &c. &c. (*Strophulus*), and even cases of infantile syphilis, from that disease appearing chiefly on the margin of the lips and mouth, as well as the anus and genitals, may likewise be returned under this head, as well as the true *aphtha infantum* of Cullen and Good. The thrush, or foul mouth, as understood in this country, is frequently but a symptom of other affections which have been, no doubt, included under this head. The case of thrush from 30 to 35 years of age, referred to above, is recorded in one of the hospitals: this may have been either an attendant symptom of other affections, or the black thrush (*Aphtha maligna*), ‘found frequently in old age, and as a symptom in low fevers and cachexies.’—Mason Good. The Irish term, *Galar Beil*, means literally the disease of the cavity of the mouth:—this term is most usually applied to an inflammatory affection of the mucous membrane of the mouth in the adult, both by the people and in the MSS., and in some parts of the country, the south in particular, *Craos Ghalar*, the open mouth, is used to denote the same affection, as well as *Scaoileadh Beil*—a separation of the lip. The true thrush, or aphthæ of infancy and youth, is often popularly termed; particularly in the west, *Beal Sa-lach*—the foul mouth; but this seems a mere Hibernicism, or rendering the English term into Irish. This disease is sometimes expressed, from the appearance it presents, by *Cluig Bhana*—white blisters; but which, occurring in the mouth, distinguishes it from the white blisters, as applied to Pemphigus gangrenosus. The proportion of thrush to all other epidemic diseases, is 1 in 257·6. The

Provincial Summaries offer the following varieties, compared with their general mortalities :—Leinster, 1 in 638·45 ; Munster, 1 in 3007·49 ; Ulster, 1 in 1019·2 ; and Connaught, 1 in 364·51 ; it has prevailed most in the counties of Leitrim, Longford, Meath, and Galway ; and the proportion of the deaths of the rural and civic districts in the General Summary is 100 of the former to 81 of the latter. Only 2 cases were returned in the hospital forms.

No. 7. PEMPHIGUS.—The deaths classed under this head amount to 17,799, as 100 males to 78·93 females, being in proportion to the total diseases and casualties 1 in 66·72, and to the epidemic affections, of which it is the seventh most fatal, 1 in 21·42. The number of diseases included in the 'synonymes, analogous diseases, popular and provincial terms' of the Nosological Table under this head, as exhibited in the foregoing classification, take in a wider range than those of any other epidemic affection ; the entries in the returns (the A. Forms) included under this head, having been most frequently *Hives*, *Black Hives*, *White Blisters*, *Mortifying Hives*, &c., all apparently vague and indefinite expressions and for which it would seem difficult to find some good term under which to include the entire ; for although the term *Hives* is indifferently applied to chicken and swine pock, and nettle rash, and water pox—varicella, pemphigus variolodes, urticaria, as well as miliary eruptions, and true pemphigus and pompholyx, these diseases, with the exception of the two latter, so seldom prove fatal in this country, that the deaths recorded under the general term of hives could not have been arranged under any head, except that given in the abstracts ; and as the true pemphigus gangrenosus is a disease of peculiar fatality in this country, I have adopted it as the leading fatal affection of which the great majority of these cases occurred. This curious disease, the symptoms of which have been long known to the people, particularly in the remote and country parts, and which has been by them significantly termed the mortifying hive ; from its peculiar appearance, the 'burnt hole,' and in Irish, *Iththeadh*, or the eating disorder, from its phagedenic character, was first described by Dr Whitley Stokes in 1808, who proposed its present nomenclature, and says, 'This disease is known by various denominations, in different parts of Ireland, as might be expected. In the counties of Dublin and Wicklow, it is called the white blister ; in the counties of Down, Antrim, Derry, and Monaghan, the Eating hive ; in the counties of Waterford and Tipperary, the burnt holes ; I would propose to call it *Pemphigus gangrenosus*. The causes of this malady are rather obscure ; it seems exclusively confined to children. Dr Spear observed that it was confined to children of three months, and from that to five years, but it has been observed near Dublin, in children of nine years old. It attacks the finest children in preference ; the children of the poor more frequently than those of the affluent ; those who live in damp situations seem more particularly subject to it than others. It appears to be infectious, though obscurely so in general ; but in the year 1800 Dr Spear observed it to spread epidemically. Children, as it is well known, are very subject to excoriations behind the ears,' (one of the principal seats of

this affection,) ' which sometimes produce formidable sores ; these may possibly in a few cases resemble the disease we speak of in its advanced stages, but in a great majority of cases these excoriations are far less rapid and dangerous than the complaint in question. On the other hand, the swine-pock (*Varicella*) resembles this disease in its first stage ; but the fever rarely precedes the eruption in white blisters, and pustules of *Varicella* dry readily. This is a disorder of great danger, but of various progress in different individuals.'

White blisters of the mouth (*Aphthæ*) are sometimes confounded with this disease, and therefore it seems probable that cases of both this and the preceding affection, thrush, may have been returned under both heads. It is possible that some cases of *Cancrum oris* may have been confounded with pemphigus. Both pemphigus and pompholyx, modifications of the same disease, have been frequently noticed in adults in this country ; four deaths have been afforded by the hospital returns, one of which was aged 20 and the other 30. The vesicles or bullæ peculiar to this affection sometimes leave an irregular lace-like mark similar to that of vaccination. Great variety will be observed in the locality of this disease, which is much more frequent in the open country than in the civic districts, and, as has been noticed by the original accurate observer, prevails in particular counties. This, added to the circumstance of its being better known to the people in one part of the country than another, accounts for the following diversity in the proportion of deaths from pemphigus to all other causes in the provinces :—Thus in Leinster it is 1 in 1226·11 ; Munster, 1 in 2153·29 ; Ulster, 1 in 17·8 ; and in Connaught, 1 in 250·27 ; and in the counties it has prevailed most in Donegal, Tyrone, Fermanagh, and Monaghan.

NO. 8. DIARRHŒA AND DYSENTERY.—It was not possible to have separated these two diseases, as a reference to the popular terms used in the Nosological Table (those under which the deaths from these causes were returned) will explain. It is the eighth most fatal disease of the epidemic class, having carried off 10,744 individuals during ten years, in the proportion of 100 males to 68·42 females ; being 1 in 110·51 of the deaths from all causes, and 1 in 35·48 of those from all epidemic diseases.

Diarrhœa and dysentery are so frequently the sequel to other affections of an acute or chronic nature, or having been the most prominent symptom previous to dissolution, many of the deaths classed under this head were, no doubt, caused by a variety of diseases, the exact nature of which could not possibly be ascertained ; and even in the hospital returns, where 809 deaths from these causes are recorded, the same deficiency of information exists. In the Irish, dysentery—*Rith Fola*, a passing of blood, is accurately distinguished from the diarrhœa, *Inrumh bronn*, which is simply a looseness or driving forth from the belly ; or *Teineas Cuirp*—the sickness of the belly. The former appears to have been epidemic at different periods in Ireland in ancient times, and is mentioned in the Annals of the Four Masters. Dr Cheyne says that ' In former times dysentery was more frequent in Ireland than it is at present ; among the febrile

diseases to which this country was liable, it stood in order of frequency next to continued fever.' In 1571 Campion, in his description of Ireland, says, 'The inhabitants, especially new ones, are subject to distillations, rheums, and *fluxes*.' In 1584, Camden states that 'The excessive moisture of the air and soil of Ireland occasions many to be affected with *fluxes* and catarrhs, particularly strangers.' 'I have endeavoured,' writes Dr O'Brien, in 1822, 'in vain to trace the existence of the disease to ages prior to the reign of Elizabeth. It is remarkable that Cambrensis, who came to Ireland in the reign of Henry II., immediately after its conquest, though diffuse in his description of the climate and soil of Ireland, is silent as to the existence of this disease; his testimony, indeed, would seem to establish the fact, that Ireland was, in these remote ages, remarkably exempt from diseases of any kind: '*Aeris clementia tanta est,*' he exclaims, '*ut nec nebula inficiens, nec spiritus hic polluens, nec aura corrumpens, medicorum opera parum indigit insula, moribidos enim homines præter moribundos paucos invenies.*' Fynes Moryson, in 1601, asserts that 'the inhabitants and strangers are troubled with looseness of the bowels, the country disease.' In 1652, Boate writes, 'The looseness doth also greatly reign in Ireland as well among those of the country as among the strangers, wherefore the English inhabitants have given it the name of *the country disease*. Many are a great while troubled with it, and yet get no other harm; and those that betimes do make use of good medicine are, without any great difficulty, cured of it. But they that let the looseness take its course, do commonly, after some days, get the bleeding with it, whereby the disease doth not only grow much more troublesome and painful, but a great deal harder to be cured; and, at last, it useth to turn to the bloody flux, the which, in some persons, having lasted a great while, leaveth them of itself; but in far the greatest number is very dangerous, and killeth the most part of the sick, except they be carefully assisted with good remedies.' Borlase, who informs us that Walter, Earl of Essex, died of the dysentery in Dublin, in 1591, says, in 1679, that 'The dysentery, or flux, so fatal to this worthy person, is commonly termed the country disease, and well it might, for it reigns no where so epidemically as it does in Ireland, tainting strangers as well as the natives.' It is enumerated in Petty's proposed bills of mortality, under the name of 'Scouring,' and in the census returns the most frequent definitions were bowel complaints and lax. 'The havoc,' says Dr Cheyne, 'made by this disease in the 17th century, vindicates the propriety of the term used by Sydenham, namely, 'the endemic dysentery of Ireland,' and entitles the flux at least to the second rank among the *leaguer* sicknesses of that unhappy time.' The same author adduces the existence of epidemic dysentery at the period of the storming of Drogheda by Cromwell, when Thomas Wood, an officer in the regiment of Colonel Henry Ingoldsby, 'ended his days of the country disease, called the flux, anno 1651, at Tredagh. At the siege of Londonderry, '*intra muros et astra,*' both in the garrison and in James's army, the looseness caused great havoc; and at Limerick many of King William's army fell a

sacrifice to the dysentery.' The works of O'Connell and Rogers notice epidemic outbreaks of this disease at different epochs from 1708 to 1740. In summer of which year Rutty says, 'Dysenteries made their appearance in July, as they did also at the same time in Plymouth;—the dysenteries, which began in July, continued through the autumn and winter; having first begun among the poor, they spread to the rich.' An epidemic prevailed in Ireland at the same time, and there was a general dearth of provisions, almost amounting to a famine; and the bills of mortality for the metropolis rose from 2201 in 1739, to 3804 in 1740–41. 'The winters of 1728, 1729, and 1730, were notoriously infamous for bloody fluxes of the worst kind, as that of 1781 hath been for a most fatal small-pox.'—*Rogers*. Dr Cheyne found, on an examination of the books of the Army Medical Board in Ireland, that dysentery prevailed among the troops to great extent at the conclusion of the last century. From 1801 to 1818 we have no record of any general mortality from this epidemic, at which latter date it became prevalent and fatal throughout the country generally, but particularly so in Dublin, Kilkenny, Clonmel, Waterford, and Cork. On the whole, the disease has decreased very much in Ireland of late years. According to the present inquiry we find its provincial proportions to all diseases to be in Leinster, 1 in 176·68; in Munster, 1 in 74·81; in Ulster, 1 in 155·76; and in Connaught, 1 in 95·14. It has prevailed most in the rural districts, and its chief localities were the counties of Cork, Kerry, Limerick, Galway, and Mayo. This is the first disease we meet with in the epidemic class, the deaths of which are so equally proportioned over all ages.

No. 9. AGUE.—The deaths attributed to this cause amount to 518, and, with the exception of glanders, the relation of the sexes differs more than any other epidemic disease, being 100 males to 44·28 females. From the return of deaths from this disease, at so early an age as the first year, and from which to the fifth, 9 males and 13 females are recorded, we may conclude that several of these were cases of intermittent and remittent fever arising from a variety of causes, as well as true quotidian, tertian, or quartan ague, the effect of marsh miasmata. The returns of this disease have been afforded almost entirely from the rural districts, and consequently they have been received from the working classes of the people, who probably, in remembrance of the previous fatality of agues in Ireland, applied the term to many other febrile attacks attended by severe rigors, and even to cases of hectic with well-marked paroxysms. The locality of this affection may be learned from the following returns:—rural district, 463; civic district, 55, including hospitals and sanatory institutions, 3.

It is an admitted fact that no disease has decreased more, of late years, in this country, than ague. The term *Fiabhrus creathach* (the shaking fever) is not to be found in the early MSS., and is entirely a word of modern origin; the Irish agues, described by Boate in 1652, were evidently cases of the true *Typhus Hibernicus*, for speaking of those diseases from which Ireland is free, he says,

'The scurvy, an evil so general in all other northerly countries confining upon the sea, is until this day utterly unknown in Ireland. So is the quartan ague, the which is ordinary in England, and in several parts of it doth very much reign at all times. As for the tertian ague it was heretofore as little known in Ireland as the quartan, but some years since, I know not through what secret change it hath found access into this island, so that at this time some are taken with it, but nothing near so ordinarily as in other countries.' May it not have been then, as we know it has been in modern times, almost entirely of English origin, and carried into this country by the annual emigrants, who have been its principal victims since the commencement of the present century? Such was the number of cases that presented in Ireland some years ago, among the labourers newly arrived from the fen and marsh counties of England, and who were the chief subjects of this disease, that the existence of ague, as an endemic affection of Ireland, has been by some denied. Isolated cases have, however, occasionally arisen, endemial to this country. From the great want of proper drainage in this kingdom, it has been a matter of wonder that, compared with England, the immunity from ague has been so great. There are, however, but very few fens or marshes in Ireland subject to an annual decomposition of vegetable matter, and I am led to believe that the bogs of this country, the water of which thousands drink, and on the borders of which thousands live, with impunity, do not in any way conduce to the propagation of ague; and much less than is generally supposed to that of other epidemic affections. Perhaps this may be owing to the very little decomposition of vegetable matter at present going forward in them, and from their containing so large a quantity of tannin.

A more minute examination of the census returns than the present inquiry would warrant, would, no doubt, throw much light on this point, particularly with reference to the greater prevalence of ague among the emigrating portion of the community. The medical historians of the last century record many minor epidemics of this disease, and in their annual reports always mention such a number of cases as prove it to have been endemic to the kingdom for the last 200 years at least. Ague forms one of the items in Petty's bills for 1681. Dr Tuomy, in his *Treatise on the Diseases of Dublin* in 1810, says, that 'during the autumn, winter, and spring, some sporadic cases of ague are commonly observed every year in Dublin, especially those of the irregular or imperfect kind; and generally under the quotidian form. But in the end of the year 1805, agues became very common in Dublin, and throughout the whole kingdom, so as to appear the prevailing epidemic; continued to spread until the ensuing summer of 1806 was far advanced; and did not disappear entirely during that year; and in the succeeding autumn and winter they again increased in frequency and severity, and became epidemic, but they were not as unusual as in the two preceding years. In the beginning of the year 1809, they broke out again, but their frequency and severity was less than during those former years. Since the epidemic of 1805, some cases of ague have been always met with in

Dublin and its neighbourhood." The Provincial Summaries offer great variety in ague compared with their general mortality ; thus it is 1 in 2,548·77 in Leinster ; 1 in 2,115·73 in Munster ; 1 in 3,005·61 in Ulster ; and 2 in 1,696·04 in Connaught. This circumstance of the greater prevalence and fatality of ague in the west, the chief locality of the annual emigration, adds additional weight to the opinion of its being at present a disease of foreign importation, and this is strengthened by the circumstance of its having prevailed most in the counties of Roscommon, Leitrim, Mayo, and Sligo, compared with the general mass of diseases in these localities. Dr Wm. Stokes has drawn attention to an epidemic outbreak of ague in 1829. The attacks of this disease have not been confined to any age from 1 to 90, but from 45 to 70 are the ages at which most deaths are recorded ; after that period, it is probable the cases returned as ague were paroxysmal diseases of some other kind, and the deaths during the early ages must have been from infantile remittent, or worm fevers, &c. &c.

No. 10. CHOLERA.—According to the annals of disease transmitted to the present day, cholera morbus has been a native of, and even occasionally epidemic in Ireland during the entire of the last century ; but its attacks were of so trifling a nature compared with its fearful visitation in the years 1832 and 1833, and the disease which then appeared was so malignant in character contrasted with common European or bilious cholera, that all other records of this affection fall into comparative insignificance.

For the reasons set forth at page ii. of this Report, the return of deaths from Asiatic cholera was naturally defective in those documents, from which the notices of other diseases were obtained.

The following return of 25,378 deaths occurring out of 66,020 cases, was therefore procured from the Board of Health, and added to the different districts of the respective counties where they occurred ; these deaths and cases returned to the health officers in 1832 and 1833, have been arranged in the following table, which exhibits, by counties and districts, the cases and deaths, with the mortality per cent. of the latter upon the former, for that period during which it prevailed most.

TABLE showing the Number of Cases and Deaths from Cholera, with their relative proportions, in the Rural and Civic Districts of the Counties of Ireland.

COUNTIES, CITIES, AND TOWNS.	CASES.			DEATHS.			MORTALITY PER CENT. ON CASES.		
	Year.		Total.	Year.		Total.	Year.		Total.
	1853	1855		1853	1855		1853	1855	
Antrim, { Rural { Civic	170	246	170	70	75	70	41-17	41-17	
Armagh, { Rural { Civic	153	338	338	65	75	141	43-42	39-38	
Belfast Town, { Rural { Civic	191	50	9	13	2	154	49-22	39-47	
Carlow, { Rural { Civic	2853	191	191	67	5	17	59-33	59-32	
Cavan, { Rural { Civic	365	2853	418	64	116	418	14-76	14-76	
Clare, { Rural { Civic	198	186	186	116	64	64	59-46	75-29	
Cork City, { Rural { Civic	40	113	325	21	70	91	58-5	58-36	
Cork, { Rural { Civic	16	208	125	11	51	62	68-74	59-47	
County, { Rural { Civic	1049	400	1459	435	165	619	43-77	43-43	
Cork City, { Rural { Civic	869	1067	1833	333	254	1619	31-08	35-34	
Cork, { Rural { Civic	3291	414	1029	240	1283	44	62	36	
Donegal, { Rural { Civic	72	454	236	77	141	178	51-38	31-03	
Down, { Rural { Civic	400	400	139	139	139	139	34-75	34-75	
Drogheda Town, { Rural { Civic	569	123	618	110	65	175	19-67	28-64	
Dublin City, { Rural { Civic	1815	1853	5533	37	461	575	39-78	35-05	
Dublin, { Rural { Civic	1341	376	1853	5533	166	678	30	44	
Dublin, { Rural { Civic	463	35	58	187	17	204	57-82	48-57	
Fermanagh, { Rural { Civic	100	26	126	50	9	60	60-66	34-61	
Galway Town, { Rural { Civic	1770	381	1970	366	85	223	56-98	46-92	
Galway, { Rural { Civic	1163	430	1163	430	85	223	56-98	46-92	
Kerry, { Rural { Civic	124	101	319	87	109	196	58-40	57-9	
Kildare, { Rural { Civic	792	304	1046	444	181	623	67-36	59-32	
Kilkenny City, { Rural { Civic	125	223	348	78	104	183	57-33	58-34	
Kilkenny, { Rural { Civic	134	391	305	91	130	221	67-91	49-8	
King's, { Rural { Civic	416	16	416	16	416	416	58-26	58-26	
Leitrim, { Rural { Civic	947	9	947	9	947	947	58-26	58-26	
Limerick City, { Rural { Civic	3059	176	1169	3059	176	1169	3059	176	
Limerick, { Rural { Civic	8	368	316	8	368	316	8	368	
L. Derry, { Rural { Civic	24	1170	1170	24	1170	1170	24	1170	
Longford, { Rural { Civic	106	106	106	106	106	106	106	106	
Louth, { Rural { Civic	333	333	333	333	333	333	333	333	
Mayo, { Rural { Civic	374	374	374	374	374	374	374	374	
Meath, { Rural { Civic	123	123	123	123	123	123	123	123	
Monaghan, { Rural { Civic	115	115	115	115	115	115	115	115	
Queen's, { Rural { Civic	220	220	220	220	220	220	220	220	
Rosecommon, { Rural { Civic	182	182	182	182	182	182	182	182	
Sligo, { Rural { Civic	1434	1434	1434	1434	1434	1434	1434	1434	
Tipperary, { Rural { Civic	1533	1533	1533	1533	1533	1533	1533	1533	
Tronoy, { Rural { Civic	871	871	871	871	871	871	871	871	
Waterford City, { Rural { Civic	33	33	33	33	33	33	33	33	
Waterford, { Rural { Civic	94	94	94	94	94	94	94	94	
W. Meath, { Rural { Civic	903	903	903	903	903	903	903	903	
Wexford, { Rural { Civic	844	844	844	844	844	844	844	844	
Wicklow, { Rural { Civic	54	54	54	54	54	54	54	54	
Total, { Rural { Civic	7555	4902	12457	7555	4902	12457	7555	4902	
Total Rural & Civic, { Rural { Civic	10033	5957	15990	10033	5957	15990	10033	5957	

It is much to be regretted, in a medical and statistical point of view, that the health officers were not furnished with, or did not require, the *sexes* and *ages* of these cases and deaths. In order, however, to include the latter in the general abstracts of deaths for counties and cities, without arranging a new class of deaths where the sexes were not specified, and at the same time to proportion those deaths into sexes, such as would offer some approximation to the truth, an accurate return of 1,857 deaths, (already included in the 25,378,) whose sexes had been registered under the inspection of medical men, was obtained at the commencement of the registration, and a proportionate division of sexes for the remainder made upon these data.

The sexes and ages of these deaths were obtained from the Dublin hospitals; subsequently a return was received of 272 deaths which happened in the Belfast Cholera Hospital, the only good and extensive country return of the kind afforded by the census inquiry;—in this, the sexes appear to vary slightly from those afforded by the Dublin returns; but the total deaths are not of sufficient magnitude to alter materially the sexes or ages. The whole, amounting to 2,129 deaths, were returned at the following ages:—

AGES.															
1 to 5		6 to 10		10 to 15		16 to 20		21 to 25		26 to 30		31 to 35		36 to 40	
M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
33	33	35	31	23	33	26	44	49	74	77	134	58	97	140	205

AGES.													
41 to 45		46 to 50		51 to 55		56 to 60		61 to 65		66 to 70		70 and upwds.	
M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
61	86	96	154	50	47	96	129	29	34	42	56	41	41

From this we learn that no age from 1 to 70 was exempt from the ravages of this invasion; but it prevailed most from 35 to 40, and 45 to 50. In 41 males and 34 females in the Belfast return the ages were not specified.

After the year 1834 and part of 1835, Asiatic cholera ceased to be epidemic, and therefore a large portion of the deaths returned subsequent to that period, must have been from the bilious cholera incidental to this country.

In the records afforded by competent medical authorities from the Dublin Cholera Hospitals, the sexes were 100 males to 137-34 fe-

males. In the Belfast Hospital, however, the males were in greater proportion.

From the foregoing table of cases and deaths, formed upon the returns of the Board of Health, we learn, that upon its first outbreak in 1832, cholera prevailed most in the towns of the civic districts; and that in 1833 it had spread throughout the country at large, and prevailed most in the rural districts.

The total deaths recorded from this disease are 50,769; but as its duration was limited, being epidemic at most for only three years, 1832 to 34, it is only in comparison with the general deaths of these years that any fair or just proportion can be made. Upon this period its comparison with the deaths from all causes, is 1 in 7·36, and compared with those of the epidemic class, 1 in 2·77. In Leinster it was 1 in 5·98 of the deaths from all causes; in Munster 1 in 5·68; in Connaught 1 in 9·86; and in Ulster 1 in 15·15. After the year 1834, when 4,419 deaths are returned, the mortality from this cause fell rapidly till the years 1837–38, when it again rose to 968 and 1,222. In the returns of cholera received in the A. forms, where the sexes have been specified, they are in the proportion of 100 males to 93 females, but including those returned by the Board of Health, and whose sexes have been calculated upon the accurate returns of the Dublin hospitals, it is but 100 males to 138·17 females. It is possible, from the general panic that prevailed upon the appearance of this epidemic, that although there may be a deficiency of the specified deaths from cholera, yet that several of the deaths recorded from that disease may have arisen from other causes; this may probably account for the manifest disparity of the sexes afforded by the A. forms, and those of the Dublin hospitals. During the years of cholera, fever and other epidemic diseases fell below the usual standard; but the years 1832 and 1833 do not present any great increase of the general mortality compared with other years. This may be accounted for by the lapse of time that occurred between that period and the taking of the census. An examination of the foregoing table of cases and deaths shows the places in which it was most fatal; but some of these, as Fermanagh and Wicklow, although apparently so high, do not afford a sufficient number of cases on which to ground a fair mortality.

In Sligo, Drogheda, and Belfast, the cases, however, were so numerous, its progress so rapid, and it proved so singularly fatal at its first outbreak, that these places attracted more attention at the time. Occasional epidemics of cholera are alluded to in the Irish MSS. under the name of *Tonn Taosgach agus Crampaidhe*—the purging and vomiting with cramps.

No. 11. INFLUENZA.—The deaths attributed to this disease amount to 10,575, as 100 males to 84·65 females; being 1 in 112·28 of the deaths from all causes, and 1 in 36·05 of those of the epidemic class, of which it is the 9th most fatal disease.

In the "Treatise of Ireland," by John Dymmok, written about the year 1600, we learn that "the inhabitants, but especially the sojourners there, be very subject to rheums, cattars, and fluxes." Boate writes,

that in the English armies which were quartered in Ireland in 1641, and after, "were not only the looseness and the malignant fever wherof we have spoken above as of Ireland's reigning diseases, very common, but then besides several other infirmities, viz. *violent coughs* and of long continuance, *stopping of the breath*, called in Latin *Dyspnæa*." For the first and best account of this "*leaguer sickness*" in Ireland, we are indebted to Sir T. Molyneux, M. D., who described a "transient fever" of this description, accompanied with "*general epidemic coughs and colds*," in 1688, and subsequently in 1693, when it was known to prevail over Europe generally. Rutty witnessed an invasion of an universal epidemic catarrh in 1729, and again in 1737, when the weekly Bill of Mortality for Dublin rose to 144. The years 1762 and 1782 were likewise memorable for its attacks. Many epizootic diseases of remarkable fatality have been recorded by authors, as appearing contemporaneously with influenza and other epidemics. A memorable instance of this kind is mentioned in 1751, and again in 1764. Although influenza has been occasionally epidemic in Ireland for so long a period, no very violent outbreak occurred during the present century till the years 1833-34, and again with marked fatality in 1836-37; when, according to calculations made by Dr Graves, "we may conclude that in Dublin alone, more than 4000 people died of the influenza, not taking into account the greater number, who, although they got over the immediate attack of the epidemic, sank afterward under various diseases of which influenza laid the foundation." This calculation, although far above what we may suppose was the actual mortality from this cause, serves to mark the violence of the epidemic which then raged. The census returns exhibit a remarkable increase of deaths from this disease in the latter year (1837), being 509 males and 363 females.

The mortality from this cause does not seem to have been much influenced by locality, having prevailed almost equally in the civic and rural districts; the deaths under this head were 1 in 81.16 in Leinster; 1 in 99.45 in Munster; 1 in 207.72 in Ulster; and 1 in 135.9 in Connaught. It is not, however, a disease so well or generally known to the people as others of the same class. It is described in the MSS. under the term *Fuacht*, as well as *Slaodan*, which is mentioned in the Annals of the Four Masters as epidemic in Ireland in the 14th century; and also *Creatan*, probably from *Creat*, the thorax, in which latter sense it is understood to be incidental to old age. It has prevailed at all ages from 1 month to 90 years.

No. 12. FEVER,—the plague of Ireland, and from the earliest period to which history refers, the most prevalent and fatal affection to which this country has been subject. The *Maculated* or spotted fever, the true *Typhus Hibernicus*, is recorded in the early Irish MSS. under the term of *Fiabhrus morgaighthe*, or the putrid fever; and also *Fiabhrus righin*, the lingering, or low nervous fever. Although the former of these words is well known to all Irish scholars, yet it is seldom used by the people, who express "*the fever*" or "*the sickness*," as it is sometimes called, by the general term *Fiabhrus*. "It is probable," write Drs Barker and Cheyne, that "continued fever

existed in this island long before the era of authentic medical records. Were we to hazard a conjecture respecting the plagues, as they were called, which accompanied the two great civil wars in Ireland—that in Queen Elizabeth's time, and that which commenced in 1641—it would be that those, strictly speaking, were not plagues, but epidemic fevers, such as have lately prevailed."

Gerald Boate, the first English writer who described these fevers under "The Diseases reigning in Ireland, and whereunto that country is particularly subject," states that, "As Ireland is subject to most diseases in common with other countries, so there are some whereunto it is peculiarly obnoxious, being at all times so rife there that they may justly be reputed for Ireland's *endemii morbi*, or reigning diseases, as indeed they are generally reputed for such. Of this number is a certain sort of malignant fevers, vulgarly in Ireland called *Irish agues*, because at all times they are so common in Ireland, as well among the inhabitants and the natives, as among those who are newly come thither from other countries." He likewise notices its epidemic nature, prevailing "in some years with so great violence, that notwithstanding all good helps, some are thereby carried to their graves; and others who come off with their lives through robustness of nature or hidden causes, are forced to keep their beds a long time from extreme weakness, being a great while before they can recover their perfect health and strength." All authorities at present agree in regarding the "Irish agues" of Boate as the true synochial and typhus fevers of this country, and not of an intermittent character. Dr Short states that, "In 1682 there raged a spotted fever in Dublin; in that year died 2262—a very high bill." "In the year 1688, in the middle of May, a fever began at London which spread over all England; and likewise over all Ireland, in July. Not one of fifteen escaped, yet not one of a thousand died; and it was observed, both in England and Ireland, some time before the fever began, that a slight but universal disease seized the horses—viz. a great deflection of rheum from their noses."—(*Rutty*.) This was a modification of the sweating sickness, (*Sudor Anglicus*.) And from the early part of the 18th century till towards its close, we have the fullest and most satisfactory records of the epidemic fevers of this country transmitted to us in the works of O'Connell, Rogers, and Rutty, the medical historians of Ireland, to which I have already referred, and which, say the eminent authorities from whom I have just quoted, (Drs Barker and Cheyne), "possess a permanent interest, and excite a feeling of regret, that the physicians who succeeded these eminent men, by failing to imitate so laudable an example, should have left a blank in the medical history of their country, which it is no longer possible to supply."

It is probable that it has been always endemic; but the first defined period of epidemic fever in Ireland is that chronicled by Rogers in Cork and its vicinity in 1708, and again in 1718–21, and 1728 to 1731; and by O'Connell from 1740 to 1743. But as the annals of disease left us by these authors are more or less local, it may be well to mention, that "when typhus begins to increase notably in the

Dublin hospitals, we may rest assured that a nearly simultaneous increase of fever will be observed in Cork, Galway, Limerick, and Belfast.”—(*Graves.*) “After the year 1721 there was again an interval of good health in Ireland, so complete that scarcely a case of fever was to be met with.” The most fearful epidemic of the last century, that in 1740 and 1741, is recorded by Rutty and O’Connell. We have certain accounts of this fever being general throughout the provinces; and “in Galway,” says Webster, “in 1840 it fell little short of the plague.” Rutty says, that “in those years it was computed, though probably with exaggeration, that one-fifth of the inhabitants died of fever.” O’Connell stated the number to be about 80,000; and again, in more modern times, it has been asserted in the Select Committee of the House of Commons (in 1830), that 65,000 died of fever in 1817. How much reliance can be placed on rough guesses of this description may be gleaned from the statistics of mortality now recorded, which, whatever may be their intrinsic value, have certainly been obtained from sources such as were not, and could not have been had recourse to by the persons who offered these conjectures—the whole amount of fever in Ireland for ten years, both in and out of hospital, not being much above 112,000; and cholera, in its three years’ progress, carried off little more than 45,000.

Rutty notices an epidemic fever in Dublin in 1745, from whence, to 1763 and 1764, the country appears to have been tolerably free from this malady. Sims mentions a violent epidemic typhus in 1771, and Cheyne another from 1797 to 1803, founded upon “the monthly returns and reports made to Government by the Army Medical Board of Ireland, the proceedings of the Governors of the House of Industry, and the records of the Fever Hospital at Waterford.” During the latter part of the last century, the health of the army was considered a good test of the health of the community generally; the soldiery being then principally located in billets or temporary barracks, were consequently liable to all the infectious diseases of the lower orders. A slight increase of fever took place in 1810, and again in 1815, but it did not proceed to any great extent till the memorable years of 1817, 1818, and 1819, “when,” say Drs Barker and Cheyne, “assuming the population of Ireland to amount to six millions, it will be no exaggeration to state, that a million and a half of persons suffered from an attack of fever in the time included between the commencement of the years 1818 and 1819. In the course of two years commencing with September 1817, more than 42,000 patients were admitted into the hospitals.” This scourge spared neither rank, circumstance, nor locality—town or country. The total number of patients admitted into the hospitals of Ireland (both temporary and permanent), during the prevalence of that epidemic, was 100,737, of whom 4349 died. These authorities likewise mention the greater prevalence and fatality of fever among males than females; this supposition, formed upon the returns of the Dublin hospitals in the epidemic of 1817–19, is confirmed by the census returns of 1841—the sexes being 60,206 males, and 51,866 females; and this proportion holds equally good, in both the districts, and in the hospitals and sa-

nitary institutions. We have no account of any pestilential fever or other formidable epidemic occurring in Ireland, until the arrival of cholera in 1832-3.

The total deaths from fever in Ireland, during the ten years included between June 1831, and June 1841, afforded by the census returns, amount to 112,072—in the proportion of 100 males to 86·14 females, being 1 death in every 10·59 of the mortality from all causes, and 1 in 8·4 of the deaths of the total epidemic class of diseases.

The provincial summaries afford the following proportions of the mortality from fever, compared with the total deaths, in the different districts, and the hospitals and institutions, &c.

Provinces.	Rural District.		Civic District.		Hospitals, &c.		Total.	
	Epidemic.	General.	Epidemic.	General.	Epidemic.	General.	Epidemic.	General.
Leinster,	1 in 3·25	1 in 13·02	1 in 7·23	1 in 19·55	1 in 1·09	1 in 2·52	1 in 3·21	1 in 10·85
Munster,	1 in 3·48	1 in 11·22	1 in 6·71	1 in 17·55	1 in 1·24	1 in 2·2	1 in 3·59	1 in 10·68
Ulster,	1 in 3·39	1 in 11·59	1 in 4·53	1 in 12·03	1 in 1·1	1 in 2·27	1 in 3·32	1 in 10·81
Connaught,	1 in 3·27	1 in 9·54	1 in 6·97	1 in 15·64	1 in 1·2	1 in 3·13	1 in 3·46	1 in 9·79
Dublin City,	—	—	1 in 8·24	1 in 21·36	1 in 1·1	1 in 2·69	1 in 3·01	1 in 7·68
Cork City,	—	—	1 in 6·77	1 in 16·75	1 in 2·02	1 in 3·77	1 in 4·49	1 in 10·51
Belfast,	—	—	1 in 4·01	1 in 10·55	1 in 1·06	1 in 1·93	1 in 2·5	1 in 6·14
Galway,	—	—	1 in 7·27	1 in 15·98	1 in 1·06	1 in 1·38	1 in 4·91	1 in 10·45
Ireland,	1 in 3·36	1 in 11·28	1 in 6·41	1 in 16·78	1 in 1·24	1 in 2·4	1 in 3·4	1 in 10·59

Compared with the general mortality, fever has prevailed most in the counties of Cavan, Mayo, Galway, and Clare, and the towns of Belfast, Kilkenny, Dublin, Limerick, and Carrickfergus. During the ten years comprised in this Report, an epidemic fever of a very malignant nature again visited this kingdom and the metropolis in particular, as an accompaniment to the influenza of 1836-7. During the latter year the deaths afforded by the census returns amount to 17,280; in the two following years the mortality fell considerably, but rose again in the year 1840, when 17,965 died. This increase, however, independent of any epidemic outbreak at that period, may be accounted for by the increased number of fever hospitals established of late years in Ireland;—thus in 1840, we find the deaths in hospitals to amount to 2,663, being double what they were in the early part of the period over which our present inquiry extends. (See Fever Hospital Statistics, pages 198 and 199.) Cases of typhoid pneumonia have no doubt been included in these returns. Thus, says Dr Wm. Stokes,—“This disease, so frequent in Dublin, at times in-

deed almost epidemic, has been long noticed under the names of the putrid, bilious, typhoid, or erysipelatous pneumonia." Fever has spared no age, from 1 month to 90 years and upwards, but its most fatal period has been from 15 to 50.

The causes of epidemic fever, and other epidemic or contagious diseases, do not come within the province of this memoir; but it must strike the medical historian and statistician as remarkable, that when the Irish records of this class of affections are accurately examined, it will be found, that, notwithstanding all that has been written and asserted upon the subject of atmospheric influence, want and distress, &c., conducing to the propagation and spread of disease, fever in particular has raged nearly decennially for the last 150 years. I do not mean to say, that it has become epidemic or fatal exactly upon the tenth year; but from the eighth to the twelfth, with an interval of from six to eight years;—thus it appeared in 1708; 1718–21; 1728–31; 1740–43; 1763–64; 1771–73; and 1817–21. In the years 1832–33 cholera took its place, but in 1837 it again appeared; and the year 1842 has been marked by a most fatal epizootic. Why those lapses of twenty years, or whether our records are deficient for those periods, cannot now be determined: this periodic invasion is nevertheless curious though unaccountable.—"The wind bloweth where it listeth, and thou hearest the sound thereof, but canst not tell whence it cometh and whither it goeth."

No. 13. ERYSIPELAS is said to have proved fatal to 1232, in the proportion of 100 males to 78·52 females, being but 1 in 963·77 of the deaths from all causes, and 1 in 309·45 of those of the epidemic class. Although arranged here among the contagious and epidemic affections, in accordance with the present system of nosology, there can be little doubt but the great majority of these deaths were of a sporadic character, its epidemic appearance being principally observed in the large hospitals, where it has decidedly become so from time to time. The deaths recorded in these institutions amount to 161; and the years 1837 and 1839 exhibit a slight increase of mortality from this cause. It prevailed more in the civic than the rural district, as 100 to 55; its attacks have not been limited to any age, but it has proved most fatal at the middle periods of life. From the 2d to the 6th year the female deaths have predominated; at all subsequent ages those of males. This affection is well known to the Irish people under the various terms of the rose, wildfire—*Tene fiadh*—the Sacred or God's fire, *Tene diadh*; the *Sacer Ignis* of ancient authors; St Anthony's fire, and the blast. *Fiolun* I have known applied to phlegmonous erysipelas, particularly when it has attacked the head and face. (See No. 77. Scrofula.)

No. 14. SYPHILIS.—The returns of this disease enumerate 384 deaths, 171 males and 213 females. This disproportion of the sexes is more apparent than real, and has arisen from the females affected with venereal (then total outcasts from society) remaining and dying in the lock and other hospitals, while a large number of the males have returned to their friends previous to dissolution; and moreover, several of the males may have been returned as dying from other

causes, as diarrhœa or dysentery, both of which are frequent symptoms of the latter stages of this disease.

In addition, it may be mentioned, that the principal lock hospital in Ireland is for females affected with syphilis. These statements receive confirmation from the returns of hospitals where the deaths are 94 males and 201 females, while in the civic and rural districts, the deaths recorded from this cause are 77 males and 12 females. The moral guilt attached to this disease naturally acted in preventing an accurate return of all the deaths which it may be supposed occurred within the ten years, particularly of those who died out of hospital. During the first four years 9 male and 10 female deaths are registered; but how many still-born children exhibited the symptoms of this disorder it was not possible to ascertain. The great mortality, however, occurred between the 16th and 45th years; but in the instances of 30 males and 135 females, the hospital registries afforded no return of ages.

The period at which this disease made its first appearance in Ireland, is involved in the general obscurity attending the history of venereal generally. It is defined in the Irish manuscripts already cited under the name of *Balgach Frangchach*, or the French pox, under which name it is also mentioned by Petty in 1681; this, as well as the *bad disorder*, are the terms in most common use among the lower orders in this country. It is now very generally acknowledged, that the venereal disease has decreased in virulence and fatality in Ireland during the last twenty years.

No. 15. HYDROPHOBIA.—The number of deaths recorded in the Summary of Ireland, (pp. 182-3,) from this cause, is 24 males and 7 females; three deaths, however, have been registered under this head during the first year; these may be questioned. That occurring at the first month was thus registered from the return in the A. form—"Bite of a dog." It was probably killed by the injuries inflicted by the animal; in either case it was an accidental death; 12 of these instances occurred in hospitals, 9 males and 3 females; among these 1 death is recorded at four years old, and 1 (a female) at from 80 to 85. With the exception of the Book of O'Brazil, MS. No. 212, the ancient authorities that have been consulted are silent upon the subject of canine madness, and the term employed in the nosological table is the modern expression in common use throughout the country. It is also popularly termed *Olc*, which means, literally, badness.

No. 16. GLANDERS—including the true glanders, *Equinia*, (so called in modern times,) and in Irish *Fothack*, and also the farcy and button farcy, *Cachmaigh* or *Tachmaigh*, destroyed 10 males and 1 female, 5 males have been returned from the rural district, and 5 males and 1 female by the hospitals and sanitary institutions. The occurrence of this affection in the human subject is happily but little known in this country. The words *Fothack* and *Tachmaigh* are employed in MS. H., 3-18 of the Brehon Laws, in the library of Trinity College.

The foregoing 16 diseases include all the truly epidemic affections

afforded by the census returns. The total deaths of this class amount to 381,249, as 100 males to 92·93 females; they are to the general mortality from all causes, 1 in 3·11 for the entire kingdom. This varies in the provinces, as 1 in 3·37 in Leinster; 1 in 2·97 in Munster; 1 in 3·25 in Ulster; and 1 in 2·82 in Connaught.

Although the term plague is employed by Petty in his proposed bills of mortality, there is no authentic record of this disease ever having visited Ireland. "The plague," says Boate, "which so often and so cruelly inflicted England, to say nothing of remote countries, is wonderfully rare in Ireland, and hardly seen once in an age." The sweating sickness has been already alluded to at p. xxii. A like disorder prevailed also A. D. 1691, in many parts of Europe, in London, and afterwards in Dublin, travelling from east to west, as did the influenza, and likewise the catarrhal fever of 1732 and 1737—(*Rutty*.) The same eminent authority informs us that the Dunkirk fever, a species of the *Sudor Anglicus*, which visited London in 1713, visited us here also, and was mortal to few. Drs Graves and Stokes have recorded the appearance of yellow fever in the metropolis in 1826–27.

The Hungarian camp fever is said to have prevailed among the English troops in Ireland about the period of the war of 1641; it is enumerated by K'Eogh.

No. 17. HYDROCEPHALUS.—Water on the brain, carried off 8,997 persons, 100 males to 78·93 females, which proportion is retained at all ages; this disease prevailed most in the civic district.

During the first year the deaths amount to 1,706 males and 1,296 females; from the first to the end of the fifth 1,768 males and 1,421 females; from the fifth to the tenth, inclusive, 1,004 males and 813 females; and from that age upward, 976 deaths are recorded, a large majority of which must have been caused by inflammation or other acute or chronic diseases of the brain and membranes, besides pure hydrocephalus, as understood by this term, when applied to the well-known infantile affection; and cases of serous apoplexy might also have a place under this head. Many cases of water on the brain occurring in infancy and the early periods of life, are mistaken for worms, gastric fever, teething, and convulsions, under which latter head there can be little doubt that several instances of hydrocephalus have been returned. 99 deaths took place in hospital.

No. 18. INFLAMMATION OF THE BRAIN—includes all those diseases of the contents of the cranium specified in the synonymes and analogous diseases, &c., of the nosological arrangement.

The deaths attributed to this cause amount to 6591, the sexes being 100 males to 78·76 females. The returns of this disease were chiefly derived from the rural districts. The hospital registries have afforded 131 deaths; but how many of these were the result of accident or injury has not been stated. Deaths from this cause have been recorded at all ages; but the chief mortality occurred from the 5th to the 30th year, and next to that from the 30th to the 60th. There is no Irish term to express this disease, the symptoms of which can be but little known to the people. From some of the returns—

"Delirious Headach," and "Brain Fever," for instance—we may conclude that cases of fever have been included under this head.

No. 19. APOPLEXY—is said to have caused death in 11,185 instances. It has occurred chiefly among males, the proportion of the sexes being 100 males to 56·82 females, or nearly double the number of the latter.

The rural districts have likewise afforded the chief mortality from this cause; the deaths in hospitals amount to 139 males and 52 females.

An examination of the tables of deaths, No. 2, by diseases and ages, may at first sight excite surprise, that no deaths are recorded earlier than the sixth year. Many cases were, however, returned in the A. forms, from the remote country districts in particular, of death from an "apoplectic fit," or simply "a fit," in children under the first year. Although apoplexy may occur at any age, and is perhaps a much more frequently fatal affection of infancy than we are at present aware of; yet as there was not sufficient grounds for supposing that the returns of apoplexy enumerated in the census papers at the very early periods of life were correct, it became necessary to limit the age under which deaths from this cause were to be registered to 10 years and upwards.

The deaths enumerated in the returns from this cause during the infantile and the early periods of life, have been registered under the head of Convulsions; this may account for the remarkable swell in the number of deaths from this latter cause during the second and third years. "Nervous disease," a very frequent return for infantile deaths, particularly in the north of Ireland, has likewise been included under the head of Convulsions. The Irish terms of *Bedhg*—a start or fit of any description, and *Bas do bheidhg*—death by a start or seizure, applying equally to sudden deaths of this kind, at all ages, may account for the so frequent enumeration of infantile deaths from apoplexy.

No. 20. INJURIES OF THE HEAD—caused death in 358 cases, 321 males and 37 females. With two exceptions in the civic district, all these deaths occurred in the hospitals and sanitary institutions; how many were the result of accident, or caused by design, the returns have not specified. (See Report upon Infirmarys and General Hospitals, page lx.) In very many instances, both in the civic and rural districts, but principally the latter, cases were specified as having "Died from the effects of a beating," or "Killed by a beating." Although these were, no doubt, in the great majority originally injuries of the head; yet from death having ensued, they have been registered under the head of Homicide, No. 88. (See also Tables of Coroners' Inquests, and page xlviii. of this Report.)

No. 21. CONVULSIONS,—the most fatal affection of the sporadic diseases of the nervous system, is said to have carried off 66,870, the sexes varying from 100 males to 76·78 females; being in proportion to the total deaths from all causes 1 in 17·75, and to those of the class to which it particularly belongs 1 in 1·55. It is the third most fatal affection recorded, being the most prominent symptom of such

a vast number of infantile diseases; it has prevailed chiefly in the rural districts, in proportion to their general mortality.

The Provincial Summaries offer the following proportion of deaths from this cause:—Leinster 1 in 14·61; Munster 1 in 16·01; Ulster 1 in 80·25; Connaught 1 in 11·19. The term Convulsions is, in numerous instances, vague and indefinite, and being so frequently an attendant upon the great majority of infantile diseases, (as well as those of youth generally,) both of the digestive and nervous systems, the deaths returned under this head must include a vast number of the other diseases of early life, as dentition, worms, water on the brain, disease of intestines, and even some of the exanthemata, as well as epilepsy, from which it cannot well be separated in extreme youth.

During the first twelve months 31,379 males and 23,443 females were registered from this cause; from the first to the end of the fifth year 5648 males and 4962 females; from the fifth to the fifteenth 796 males and 637 females. After this period the deaths returned as convulsions were registered under the head of Epilepsy, except four, occurring under the twenty-fifth year.

In the Irish tongue, both in the MSS. and by the people, several terms are used to express this, or similar affections; thus, *Crupan*, cramp, or spasm, is applied to convulsions, and also *Feith-chrapadh*, a contracting of the sinews, which, from its being still in use among the people, I have adopted in the nosology. It is thus styled in the modern lexicons; but at the present day the English term is as frequently used among the Irish-speaking population as any other. *Eslainte na Bhfeitheadh*, is applied to nervous affections generally. Another term in use is that of *Comhtharaing na Bhfeitheadh*, a pulling of the sinews; in English the disease is commonly expressed by convulsions, fits, spasms, or nervous contractions (an English translation of the Irish term), and also cramps. Black fits, although mentioned in the returns up to the second and third years, is more particularly applied to *Trismus Nascentium*. Great regularity will be observed in the table of deaths by years from this cause.

No. 22. PARALYSIS—proved fatal in 7206 instances; 100 males to 72·22 females. It has been most fatal in the rural district. Deaths from this cause have been registered at all ages; but its most fatal period has been from the 45th to the 60th year. 286 male and 87 female deaths occurred in hospitals. The Irish term *Leath-mharbh*—half-dead, is an apt and significant expression, and has probably been derived from the Latin, as it is frequently used in the early MSS. as well as *Crioth*, palsy (*Paralysis Agitans*), a disease which appears to have been more frequent in former times in this country than at present. Many cases of apoplexy are, no doubt, included in these returns. Two cases of *Chorea*, a male aged 25, and a female aged 45, which were returned by the hospital records, have been registered under this head.

No. 23. LOCKJAW—affords a return of 238 deaths; 172 males and 66 females; 59 cases occurred in hospital. In proportion to its general mortality, more deaths from this cause took place in the civic

district. During the first month, 22 male and 18 female deaths were registered; there can be little doubt but that these were cases of *Trismus Nascentium*, an affection well known to the lower orders in Ireland, by whom it is denominated inward fits, black fits, and the nine day fits;—1 male and 3 females of these latter have been afforded by the lying-in hospital returns. Dr Collins states that out of 274 deaths of children in the Dublin Lying-in Hospital, during 7 years, 37 died of this disease. Dr Joseph Clarke says, that “at the conclusion of the year 1782, of 17,650 infants born alive in the hospital 2944 died within the first fortnight;” of these nearly 19 in 20 died of the nine-day fits. From the first month to the end of the twelfth 18 deaths are recorded; these were in all probability convulsions of another description. Although deaths from tetanus or lockjaw are registered at all ages, the periods at which it has proved most fatal were 10 to 20, 25 to 30, and 45 to 50.

No. 24. *EPILEPSY*—presents a return of 1030 deaths—100 males to 68·57 females. The A. forms afford a return of deaths from this cause at all ages, but those under the 6th year, with two exceptions, have been arranged under the head of Convulsions. The Irish MSS. make frequent mention of this disease, and its symptoms are of too formidable a nature to be mistaken by the people, who significantly express it by *Teineas mor*—the great or terrible disease; it is also frequently denominated, *Teineas Phoil*—St Paul's disease; and *Teineas Eoin Baiste*—the disease of St John the Baptist; not that it is supposed either of these persons were affected with epilepsy, but on account of certain charms for curing this disease, said to have been derived from these apostles.

All these are not terms in general use throughout the whole country, but are individually applied in particular districts. In English, the most frequently used term is falling sickness; it may be in connection with the opinion of epilepsy and demoniac possession being the same disease, that the names of the apostles have been applied to it, from their power of casting out devils. 179 male and 85 female deaths occurred in hospital. The ages at which this disease proved most fatal were from 10 to 15, and from 20 to 40; the males predominate at every age except from 5 to 10, and 15 to 20, when the females are the most numerous.

No. 25. *DELIRIUM TREMENS*—destroyed, according to the census returns, 69 males and 8 females; 71 of these cases occurred in hospitals. No doubt the general mortality throughout the country during the ten years could have afforded many more deaths from this cause, were the disease better known to the people. Where instances of delirium tremens occur in the civic and rural districts, they have been, in all probability, returned under the head of Insanity. (See Coroners' Inquests and Intemperance, No. 87, page. xli.)

No. 26. *INSANITY*.—The registries of deaths from this cause amount to 1,511, the sexes being 100 males to 84·04 females. Of these, 1,065 were returned in the A. forms from the civic and rural districts, 47 from the infirmaries, general hospitals, and jails; 327 were deaths recorded by the special lunatic asylums, as having occur-

red from mania or maniacal exhaustion : the remaining 2,451 deaths of these latter institutions being registered under the particular diseases that were reported to be the immediate cause of death ; as 338 of epidemic or contagious affections, which, with the exception of diarrhoea (so frequently the termination of mania), may be said to be more or less accidental to these persons ; or deaths from the usual casualties of this country, totally independent of the state of mind or cerebral affections of these persons. (See Table of Deaths, of Lunatics, Idiots, and Epileptics, and Report upon Insanity, pages li. to lix.) In this latter (see page lii.) 327 cases alone are returned as having actually died of insanity or pure maniacal exhaustion ; and these are all that have been added to the disease of insanity in the General Summaries, with the exception of 47 males, and 25 females—the entire mortality of one asylum returned as insanity. These were placed under that head in the tables of the Queen's county ; but, in forming those for the lunatic asylums, they were added to the deaths from “ causes not specified,”—it being manifest that the immediate cause of death had not been given. Were the remaining 2379 deaths of Lunatics added to those afforded by other sources of information, it would present a return of 3,890 deaths of insane persons, and those idiots and epileptics confined in the different asylums for 10 years, the proportion of sexes being then 100 males to 78·35 females ; but as in the asylums, so also in the country at large, the relative numbers of the sexes vary according to the different ages—the females increasing towards the period of advanced life, confirming the opinion expressed in another portion of this report, that female lunatics live longer than male. According to the General Summary by ages, (page 183), we find that from 25 to 50 was the age at which 1289 of the deaths took place. The average age at which death occurred in both sexes, being, according to these returns, from 35 to 40. This disease has prevailed more in the rural district in comparison with its general mortality—the 10 deaths after 85 years of age may have been cases of the natural *dementia* of old age. All the various descriptions of mental aberration specified in the nosological classification, are intended to be included under the general head of lunacy. The Irish term *Dasacht*, introduced in the nosology, is a very ancient expression, and found in some of the oldest MSS. Melancholy (*Monomania*) is by some denominated *Feith*, “ the nervous affection,” literally a cold humour.

The total deaths from diseases of the nervous system enumerated by the census inquiry, are 104,063, in the proportion of 100 males to 73·87 females. Compared with the general mortality from all causes, the deaths of this class amount to 1 in 11·41.

In the Provincial Summaries this class (diseases of the nervous system,) compared with the general mortality, appears to be, in Leinster 1 in 9·26 ; in Munster 1 in 10·83 ; in Ulster 1 in 23·19 ; and in Connaught 1 in 8·98.

No. 27. CYNANCHE.—Under this general term are intended to be included the deaths from all the diseases of the throat, pharynx, and larynx, &c., except croup. As, however, 413 deaths are registered

under this head during the first year, we may suppose that a great number of them are cases of *Cynanche Trachealis*. The total deaths returned are 2,181, as 100 males to 83·43 females; but this proportion varies at the different periods of life: thus in the first five years the sexes are 451 males and 418 females; from 5 to 15, 151 males and 165 females; and from that upwards, 559 males and 398 females. To attempt any more minute division of the affections classed under this head, where "died of a suffocation," or "died of a choking in the throat," "quinsey," or "squinsey," (after the age of puberty,) were the terms most generally employed, would have defeated the object intended in these tables of deaths. The following 43 cases of laryngitis have, however, been returned:—Hospitals of the city of Dublin, 21 males and 8 females; wards of do., 1 male; and hospitals of the county Dublin, 8 males;—hospital of Longford, 1 male; Meath, 1 male; Queen's county, 2 males and 1 female.

Putrid and ulcerated sore throat are also terms in common acceptance for a variety of diseases of the throat and fauces, as well as the windpipe and organ of voice. In several of the inflammatory affections of the throat, attended with difficulty of swallowing and swelling, or even relaxation of the uvula, tonsils, and soft palate, a popular prejudice exists very extensively in the country parts, that both the hard and soft palate have fallen down into the cavity of the mouth and pharynx, and for this *dry cupping* (known for centuries to the Irish people) of the crown of the head is employed, as well as procuring a person of a certain name to lift the patient off the ground with his teeth, by the lock of hair that grows upon the extreme vertex. Hence the term "palate down," which I have introduced into the list of popular phrases, and also that of *Sineadh Seain*, or "John's teat down"—the uvula being thus denominated. This disease has predominated in the rural district; 121 deaths under the head of cynanche were afforded by the hospital returns. Cases of mumps (*cynanche parotidea*) are included in this cause of death.

NO. 28. INFLAMMATION OF THE LUNGS.—27,684 deaths are attributed to this cause, 100 males to 63·11 females; but how many of these were cases of *pneumonia* it would be difficult now to guess at, from the only sources of information attainable expressing the affections that I have classed under this head by "pleurisy, impression on the chest, or lungs, a pleurisy fever, or a severe cold." These deaths may, however, be generally received as having been caused by *disease of the cavity of the chest*. They occurred at all ages; but the most fatal period has been from the 45th to the 60th year; the relation of the sexes is preserved equally throughout.

NO. 29. BRONCHITIS.—Inflammation of the air passages, and their lining membrane;—being but little known to the people, being but a variety of inflammation of the lungs, and differing from *pneumonia* only in the texture affected, no extensive return of deaths from this cause could have been expected, except from the educated class of society, or the hospitals. The deaths from this disease afforded by the census are 450—as 100 males to 69·17 females; of these, 21 cases are returned by the rural, and 8 by the civic district, and 421

by the hospitals and sanitary institutions. As this is a frequent cause of death among the aged, its most fatal period has been, in like manner, with the foregoing disease, (*pneumonia*), from the 45th to the 60th year. It is more than probable, that a large majority of the deaths registered under inflammation of the lungs after the 50th year, were caused by acute or chronic bronchitis, the latter of which so frequently proved fatal to old people.

Had not the hospital returns presented so large a mortality from this disease, it might have been included along with the preceding one, under the general heading of inflammation of the chest.

It may, however, be remarked upon this, and similar registries afforded chiefly by medical persons, that although it does not pretend to give a return of *all* the deaths which it may be supposed occurred from *bronchitis* out of the 1,187,374 deaths recorded, yet it presents a valuable statistical account of 450 cases of this disease, their ages, sexes, localities, and the years in which they took place.

No. 30. CONSUMPTION.—By far the most fatal affection to which the inhabitants of this country are subject—exceeding the returns of the article of fever by 23,518 deaths during the ten years—is reported to have destroyed 135,590 of the population of those families from whom the returns were received on the 6th June 1841—being to the deaths from all causes 1 in 8·75; to those of the entire class of diseases of the respiratory and circulating organs 1 in 1·31; to the total number of deaths from epidemic, endemic, and contagious diseases, as 100 to 281·17; and to fever alone as 100 to 82·65. The sexes are 100 males to 113·07 females, being the only one of this class of diseases, except asthma, where the females preponderate.

The returns of deaths from consumption have been received chiefly from the rural districts, being on the general mortality in the proportion of 100 to 25·71 of those in the civic districts;—1,706 cases of phthisis have been registered from the hospital records. Compared with the total deaths of the provinces, it appears to be, in Leinster 1 in 6·95; in Munster 1 in 9·83; in Ulster 1 in 8·76; and in Connaught 1 in 11·11. An examination of the table of deaths shows it to have particularly prevailed in the counties of Carlow, Kildare, Queen's, Westmeath, Down, and Limerick city.

Although cases of *chlorosis*, and also of hectic fever, arising from various diseases, (surgical and medical,) as well as diseases of the liver, and all general causes of wasting or decay, may be included under this head, there can be little doubt, from the great prevalence of *tubercular* and other scrofulous diseases of the respiratory organs in Ireland, that these deaths include the great mass of *phthisis* in this country. It is certainly remarkable, and what appears to add considerably to the validity of these returns, that an attentive examination of the Summary of Ireland by years, page 182, shows us how steady has been the mortality from this cause—both in number, in sexes, and particularly in years. During the early years, up to 1835, the returns are, as must have been expected, fewer, owing to the length of time that had elapsed from that period to the date when the inquiry was made; yet in these the relation of the sexes is pre-

served; but from 1835 the returns of this disease may be expressed by the following figures:—

Years.	Sexes.		Total.
	Males.	Females.	
1836, .	6,810	7,793	14,603
1837, .	7,541	8,537	16,078
1838, .	7,249	8,232	15,481
1839, .	7,765	8,908	16,673
1840, .	7,571	8,555	16,126
1841, half of	3,969	4,392	8,201

From this it may be gleaned not only the steady condition of the mortality from this cause, but that it was the same disease returned by the people in all parts of the country throughout the entire period.

A vast multitude of deaths occurring at extreme infancy, and during the very early periods of life, were returned as having been caused by consumption, decline, and decay, (the two latter being the most common terms for this disease among the lower orders);—now, although it cannot be denied that tubercular phthisis may occur at any age (instances are recorded of tuberculous matter, and even cavities, being found in the lungs of new-born infants); yet, as it is not a general disease of very early life in this country, it became necessary, in arranging the registration, to limit the age at which deaths were to be registered as having been caused by *phthisis pulmonalis*. That age has been made the 10th year, and all cases returned of an earlier age have been placed under a separate head, that of Marasmus, No. 50, (which see, page xxxii.), for the reasons there detailed, as being the best term under which to register the cases of the tubercular diseases of early life, (*phthisis infantum*.) This will account for the apparent disproportion of deaths from consumption under the 10th year, in the Summary of Diseases and Ages, page 183.

The most fatal age has been from the 15th to the 30th year, and then from that to the 50th. The hospital returns having afforded 23 cases under the 10th year, they have been registered as such, as I have in no instance altered any of the returns of disease or age afforded upon proper medical authority.

The Irish definition of this disease is very significant and expressive, *Seilgean as*—a shrinking of one's self, as well as a wasting or decay; but it is applied to any state of atrophy or decline, with or without disease of the chest.

NO. 31. SPITTING OF BLOOD.—*Hæmoptysis*. All internal hæmorrhages are popularly denominated “bursting a blood-vessel,” and therefore both this disease and vomiting of blood (*hæmatemesis*) are frequently expressed by the same term;—69 deaths, 46 males and 23 females, are said to have died of the former, of which 49 occurred in hospital. *Hæmoptysis* is so frequently but a symptom of other affections of the chest, that it would be difficult to attempt any further or more minute classification of these hæmorrhages. The 3 deaths returned from this cause at the infantile age must have been produced by bleeding from some internal organ, but of which, cannot here be conjectured.

It is frequently mentioned in the MSS. as *Silsadh fola*,—a drip-

ping of blood, in contradistinction to *Urlacon fola*,—or true hæmatemesis.

No. 32. **ASTHMA**,—10,594 deaths have been attributed to this cause, 100 males to 102,98 females; being in proportion to all diseases 1 in 112·07, and to those of the total affections of the organs of respiration and circulation, of which it is the third most fatal disease, 1 in 16·88.

Although this may not be too large a proportion in either case, yet as the symptoms of dyspnoea; “difficulty of breathing; shortness of breath; cough with a smothering,” &c., are also constant attendants on other lung affections, besides asthma, (simple or spasmodic,) chronic emphysema, chronic bronchitis, &c., the registration under this head must speak for itself. Deaths from this cause have been returned at all ages from 10 upwards. The most fatal period, however, appears to have been from 45 to 75. 115 cases happened in hospitals.

No. 33. **VOMITING OF BLOOD**—destroyed 75 persons, 49 males and 26 females, or very little more than those from hæmoptysis; but a greater number of instances of vomiting of blood have been recorded in the A. forms than spitting of blood. 58 were returned from the rural district, 17 by the hospitals, and none from the civic district. The observations made upon disease No. 31. apply equally to this.

No. 34. **DISEASE OF THE HEART**—*Morbus Cordis*—2015 deaths have been recorded as diseases of the heart or pericardium, 100 males to 76·44 females. Of these, 257 were registered upon the authority of the hospital records, and may be fairly presumed to be correct; but upon the 1292 cases afforded by the A. forms of the rural, and 466 by those of the civic district, little reliance can be placed; not because the total number of these taken together offers too great a mortality from this cause for the entire country during ten years, but from the circumstance of diseases of the heart being at present so little known among the non-medical portion of the community of all ranks, and also from the well-known fact of the terms “beating at the heart,” “pain in the heart,” “palpitation, gnawing, and bursting of the heart,” and even of “worms eating the heart,” and many other equally vague expressions, being applied by the country people to various forms of dyspepsia, constipation, and affections of the stomach and abdominal viscera, particularly in the region of the *Scrobiculus Cordis*, “the pit of the stomach,” or upper portion of the epigastrium, commonly understood by them to be the region of the great centre of the circulation. Again, the symptom of palpitation (*Luas craidhe*), on which, no doubt, a great number of these returns have been founded, is so frequently an attendant upon other affections of the chest, abdomen, uterus, or the nervous or sanguineous systems, that little reliance can be placed on it (even by professional persons) as a means of diagnosing true heart disease. Finally, it is more than probable that the deaths which were really caused by *Morbus Cordis* have been returned under the head of Dropsy or Asthma; the former in particular being a well-marked and promi-

nent symptom towards the close of such affections ; therefore the 257 hospital cases are those only to be relied on. Of these cases, death took place most frequently from 16 to 46 years of age. (See page 204.) 8 males and 9 females were returned by the hospitals as deaths from *Pericarditis*, probably the sequel to rheumatic affections of other organs, or that had occurred after accidents or operations. These hospitals were those of Drogheda, 3 ; Dublin city, 8 ; Dublin county, 5 ; and Meath, 1. -One death from inflammation of the pericardium was returned in the A. forms of the city of Dublin.

No. 35. WATER ON THE CHEST—proved fatal to 158 persons, 92 males and 66 females. 65 cases have been returned by the hospitals. The age at which most deaths occurred was from 40 to 60. Two cases have been registered out of the A. forms, aged 12 months. I can offer no opinion as to the disease of which they probably died.

No. 36. ANEURISM—killed 71 persons, 63 males and 8 females. 55 of these deaths occurred in the public hospitals. Except where the hæmorrhage took place externally, or that the cases occurred among the educated portion of the community, an accurate return of all the deaths from this cause could not be expected ;—two cases were returned under 2 years old, probably from *nævus*. The most fatal age has been from 30 to 60 ; but in 20 instances afforded by the hospital records the ages were not specified. This disease is mentioned in the Irish MSS. as *Raobadh cuileann*, a rupturing of the pulse.

No. 37 and 38. EMPHYSEMA AND EMPYEMA—could only be received from the hospitals and medical institutions. The former proved fatal in 18 instances—12 males and 6 females ; and the latter in 14—10 males and 4 females. Empyema (matter or fluid in the chest,) is known in the MSS. under the name of *Neascoid chleibh*,—a boil or abscess in the chest.

The entire deaths from the diseases of the respiratory and circulating organs amount to 178,919, in the proportion of 100 males to 101·72 females. Compared with the general mortality from all causes ; that from epidemic and contagious diseases ; and also with those of the digestive organs, we find the following proportions exhibited by the different provinces and the country at large, in which the first column refers to the epidemic class, the second to the diseases of the digestive organs, and the third to the total deaths from the entire mass of diseases :—

Circulating and Respiratory Organs.				
Leinster,	. . .	1 to 1·7	1 to ·66	1 in 5·75
Munster,	. . .	1 to 2·24	1 to ·66	1 in 6·68
Ulster,	. . .	1 to 2·11	1 to ·76	1 in 6·89
Connaught,	. . .	1 to 2·84	1 to ·69	1 in 8·08
Ireland,	. . .	1 to 2·13	1 to ·69	1 in 6·63

Presuming the return of deaths for all Ireland for so much of the year 1841 as was included in the census inquiry, and half the year 1840, with $\frac{1}{6}$ added to make up the remainder of June of that year, to be as near an approximation to the annual mortality of Ireland in a healthy year, as it is at present possible to arrive at, we shall find

that the diseases of the respiratory and circulating organs were to those of the epidemic class as 5 to 9·26 ; to the diseases of the nervous system as 5 to 2·6 ; to those of the digestive organs, 5 to 3·67 ; to those of the urinary, generative, locomotive, and tegumentary systems, taken together, 5 to ·71 ; to the deaths caused by diseases of uncertain seat, 5 to 7·28 ; to the violent or sudden deaths, 5 to 1·01 ; and to the total deaths, including the causes not specified, as 5 to 31·57.

The hospital records afford a return of 3352 deaths in this class.

(*To be continued.*)

ART. II.—*A Concise View of the Progress of Military Medical Literature in this country ; being a chronological Arrangement of Authors, with Critical Remarks on their Works.* BY JAMES IRVING, M.D. (Continued from p. 98.)

1752. *Observations on the Diseases of the Army in Camp and in Garrison.* By Sir John Pringle, Bart. Lond. 8vo.

Sir John Pringle, the youngest son of Sir James Pringle of Stitchell, in Roxburghshire, was born on the 10th of April 1707. Having received a liberal education in the University of St Andrews, he repaired to Edinburgh in 1727, and at that university studied medicine for one year. He afterwards went to Leyden, and was a pupil of the famous Boerhaave, who was then considerably advanced in life. He graduated at Leyden on the 20th of July 1730. In March 1734 he was elected joint professor of moral philosophy at Edinburgh ; and after the death of his colleague, Mr Scott, continued to discharge the duties of the chair, along with those of a medical practitioner, till the year 1742, when he was appointed private physician to the Earl of Stair, Commander-in-Chief of the army then serving in Flanders ; and in the autumn of the same year was nominated physician to the British military hospitals. In the year 1744, Pringle, through the influence of the Duke of Cumberland, who had succeeded the Earl of Stair in the command of the army, received commissions as “ Physician-General to His Majesty’s Forces in the Low Countries, and parts beyond seas,” and as “ Physician to the Royal Hospitals.” In the following year he returned from Flanders, and on the 31st of October was elected a Fellow of the Royal Society. In 1746 he attended the Duke of Cumberland’s army in Scotland, till the dispersion of the rebels at Culloden permitted their return to England, when, in conjunction with Dr Armstrong and Dr Barker, he was appointed physician to an hospital for lame, maimed, and sick soldiers, which had been erected behind Buckingham House, London. In 1747 he again served with the army in Flanders, where he remained till the peace of Aix-la-Chapelle, concluded during the following year. In 1756, in conjunction with Sir Clifton Wintringham, Pringle was appointed “ Physician to the Hospital for the service of the forces of Great Britain.”

He seems now to have settled in London, and held very high medical appointments about the Court, being physician to several of its members, and being in 1774 elected Physician Extraordinary to George III. Honours crowded upon him from all quarters ; he was a member of many of the most eminent literary and scientific bodies, both at home and abroad, and in the year 1766 was created a baronet. His election to the presidency of the Royal Society of London took place in 1772 ; and as long as he occupied the chair, on presenting the Copley Medal, he read to the members a discourse on the history and present state of the particular science for which the medal of the year had been awarded. The six discourses thus delivered, which show an intimate knowledge of every branch of science upon which they touch, were published after his death by his friend Dr Kippis. He continued president till the year 1778, when he resigned on account of some curious circumstances connected with a discussion in the society, as to whether electrical conductors ought to terminate in knobs or points. Dr Franklin had recommended points, and the propriety of this recommendation had been sanctioned by the society at large ; but on the breaking out of the American war, Franklin was looked upon by many as an enemy to England, and " as such it appears to have been repugnant to their feelings to act otherwise than in disparagement of his scientific discoveries. Among this number was their patron George III., who, on its being proposed to substitute knobs instead of points, requested that Sir John Pringle would likewise advocate their introduction. The latter hinted that the laws of nature were unalterable at royal pleasure ; whereupon it was intimated to him that a president of the Royal Society entertaining such an opinion ought to resign." (Penny Cyclopædia, vol. xix. p. 13.)

In 1781 Sir John Pringle came to Edinburgh with the view of making it his permanent residence ; but the state of his health, and the restlessness of his spirits, induced him to return to London before the close of the same year. Before quitting Edinburgh, however, he presented the Royal College of Physicians, of which he was a fellow, with ten folio volumes of " Medical and Physical Observations" in MS., upon condition that they should neither be printed nor allowed to go out of the library of the college. He continued in a weak state of health, and died on the 18th of January 1782, at the age of 75. (Kippis's *Life of Sir John Pringle*, prefixed to his *Six Discourses*. *Encyclopædia Britannica*, vol. xxviii. p. 536. *Penny Cyclopædia*, vol. xix. p. 13. *Edinburgh Encyclopædia*, vol. xvii. p. 155.)

His "Observations on the Diseases of the Army" are divided into three parts. The first, which is drawn up with much judgment, contains an abridgement of a medical journal, which the author had regularly kept during his service on the Continent from the year 1742 to the year 1745 ; in this country during the Rebellion in 1745 and 1746, and again when attached to the army on the Continent in the years 1746 and 1747. Here we find a succinct account of all the movements of the army, of epidemics in the order of their oc-

currence ; we are furnished with materials for illustrating some of the causes of the diseases of soldiers, and for suggesting measures for either preventing or lessening such causes of disease in future campaigns. He is studious to give merely a narration of facts, and has reserved his reasoning on those subjects for the second part of the work, which is occupied with a discussion on military diseases in general, their causes, and method of prevention. Many valuable observations are to be found in this part of the book, as to the most effectual means of obviating or preventing the diseases arising or inseparable from the life of a soldier in active service. In a chapter "on the seasons, with regard to the health of an army," we have some materials to assist in determining the probable strength of an army at any given period during a war ; the effects of long or short campaigns on the health of troops ; the difference produced on the health of soldiers by taking the field early, and going late into winter quarters, and other calculations of a similar nature. He confesses that he had too few data from which to deduce certain consequences ; yet without subscribing to the correctness of all his inferences, we may gather some useful information ; and the statements which he has given become interesting when we contrast them with the returns of our armies in more recent times, when the means of preserving the health of soldiers are said to be more fully comprehended. With respect to the alleged seasoning of soldiers, he remarks, that "those troops will be best seasoned to undergo the fatigues of a second campaign, whose constitution has been least weakened in the first." (Part ii. chapter iv.)

The third part is occupied with an account of the symptoms and treatment of the diseases most prevalent in armies during active service. In the treatment of inflammatory fever, his chief reliance was placed on blood-letting, to which we also principally trust ; but the essential difference between his practice in fevers, and that which is now followed, consists in this ;—that we knowing the natural tendency of febrile diseases to terminate favourably, trust much to the "*vis naturæ medicatrix*," merely watching and being ready to treat unfavourable symptoms as they occur ; whereas much of the practice of former times was occupied in almost invariably fruitless attempts to cut short the disease.

But a distinctive mark by which Sir John Pringle's treatment of inflammation and of continued fever may be known from that of many physicians of the period in which he lived, is the judicious manner in which he administered cinchona. He did not give bark, according to the prevalent rage, while febrile symptoms were present, but waited till these had been subdued, and the body being in a state of great exhaustion, required the use of tonics ; under which circumstances this medicine is now known, not only to be admissible, but also to be highly beneficial. He was among the first to recommend local bleeding by means of leeches in cases of ophthalmia ; in severe cases premising general blood-letting, but in others in which the disease was not so acute, he relied alto-

gether on the topical abstraction of blood. But we are told that in cases having a specific origin, such as iritis and strumous ophthalmia, blood-letting, either locally or generally, should never be practised ; and we are presented with a prescription for an ointment in which the active ingredient is acetate of lead, and which is said to be useful in these and similar cases which "are not to be cured by the common ophthalmic medicines."

He records three cases of abscess of the liver, only one of which terminated favourably, and this in fact was the only instance of recovery with which he had met ; the matter pointed externally, was evacuated by making an incision, and the patient was soon afterwards convalescent. It is very positively asserted that all cases of rheumatism, even of the chronic forms, are attended with *sizy* blood, and if in any case the blood does not present this peculiarity, "we may suspect that the soldier either pretends indisposition, or that his pains are of another nature." But although in rheumatism the blood is more frequently *sizy* than in any other inflammation, it is by no means always so, and Pringle's opinion seems to have been too hastily formed ; for though buffed blood had always been discovered, even in the chronic cases which occurred in the army in the Low Countries, he has the candour to confess in a note to a subsequent edition of his work, that he had since seen persons labouring under the same disease, and who had no temptation to deceive, yet in whom the blood was perfectly natural. His treatment of all forms of rheumatism consisted in the free abstraction of blood ; in acute cases bleeding every day till the "feverish heat and the pains were entirely removed, or made much easier ;" and in chronic cases, drawing about eight ounces of blood every eight or ten days, as "long as it was *sizy* or the complaints remained." In the intervals he purged the patient freely with gum guaiacum. As a remedy in cases of rheumatism, he had no confidence in mercury. It is to be observed that in all cases of inflammation, his hobby seems to have been blistering, which he employed rather profusely, and with a more liberal hand, and in circumstances in which it is not now recommended.

Of the "Bilious, or the Autumnal Remittent Fever of the Army," he has given an elaborate history, including an account of the symptoms, causes, and methods of cure ; and his own experience of this disorder, and what he read of it in the works of others, led him to form an opinion on the subject which has been confirmed by the testimony of army surgeons of our own day ; namely, that this fever is the same disease, only differing in degree, which occurs in the West Indies under the name of yellow fever, and in the East Indies, and other places, under the names of remittent or bilious remittent fever, &c. He has brought forward some interesting details under the head of dysentery ; he has given a full account of the symptoms, with a critical examination of the opinions of some former writers ; and he has fully established the fact that, under certain circumstances, this disease may become contagious. He seems to think that the great sources of this contagion are the privies,

foul straw on which the men lie, and even the hospitals themselves, if crowded and ill-aired. His method of treating dysentery does not materially differ from that which was employed by Dr George Clegghorn. Sir John Pringle, however, here alludes to a practice which had been successfully followed by M. de Senec, Physician General in the French army, and which is rather novel in its nature. After full evacuations by vomiting and bleeding at the arm, a grain of tartar-emetic was dissolved in a pint of whey or chicken broth, and was given to the patient in divided quantities so as to answer the purposes of physic, food, and drink, till a recovery was effected.

The hospital or jail fever, a disease too often fatal, and owing its origin to the effluvia from foul sores, to filth, or to confinement in any ill-aired place, is discussed in a very learned chapter, in which he has selected from many authors, ancient and modern, accounts of the ravages of this disease at various times, and has brought forward some original matter illustrative of that difficult subject, contagion. The Appendix contains a number of experiments upon septic and antiseptic substances, with remarks relating to their medical uses; which formed the substance of a series of papers read before the Royal Society of London, but which it would be foreign to our purpose to mention more fully in this place.

Editions.—Lond. 1752, 8vo. Lond. 1753, 8vo. Lond. 1761, 8vo. Lond. 1765, 4to. Lond. 1775, 8vo. Lond. 1788, 8vo. This sixth is the last edition published during the lifetime of the author. 7th edit. Lond. 1783, 8vo. A new edit. Lond. 1810, 8vo. This work has been translated into the French, German, and Italian languages. Of the French translation there are two editions. Paris, 1755, 2 vols. 12mo. Paris, 1771, 2 vols. 12mo.

Reviewed.—Monthly Review, vol. vii. p. 52.

1753. *Historia Febris anomalæ Batavæ, annorum 1746, 1747, 1748, &c. Accedunt Monita Siphylica.* Auctore Jacobo Grainger, M. D. Edinburgi, 8vo.

Dr Grainger, the well-known author of the *Sugar Cane*, and the translator of *Tibullus*, was born at Dunse, in Berwickshire, in the year 1724. He studied medicine at Edinburgh, and entering the army, was surgeon to Pultney's regiment at the battle of Falkirk in 1745. He afterwards served on the Continent; and, quitting the army after the peace of Aix-la-Chapelle, settled as a practitioner, first in London, and afterwards in the island of St Christopher, in the West Indies, where he died on the 16th of December 1767, in the forty-fourth year of his age. He was a man of learning as well as taste, and lived on terms of intimacy with Dr Johnson, Dr Percy, and other distinguished characters. (*Anderson's British Poets*, vol. x. p. 891.)

This work is the result of his observations on some of the diseases that fell under his notice while serving with his regiment in Flanders. It is divided into three parts; of which the first con-

tains a history of the autumnal remittent fever of 1746 and 1748, and an intermittent fever which harassed the troops in the spring of 1747. Here we have an elaborate account of these fevers and other diseases, such as dysentery and dropsy, either consequent upon or accompanying them. If we meet with nothing that is not fully discussed by Pringle and the other physicians who have written on the diseases of the troops serving on the Continent at this time, it ought to be remarked that Dr Grainger asserts, that his book was written previously to the publication of Pringle's in 1752, but had been delayed by some untoward circumstance. The varieties of symptoms in such cases as fell under his inspection are carefully and accurately distinguished. The fourth chapter contains remarks on the prognosis; and the fifth treats of the causes of intermittent fever, especially that of the year 1748. The second part consists of twelve chapters; in which the curative and prophylactic methods of treating the disease and its complications are fully explained, and the particulars of the cure required for different stages and to fulfil different indications are fully stated. Here he shows much reading, but there is not much new matter brought forward. He seems to have entertained a very high opinion of emetics as a remedy for fevers. On bark there is a long chapter, which is partly historical; it includes replies to the objections frequently urged against its use, points out the circumstances in which it may prove injurious, and gives directions for its more effectual application in cases in which it is convenient or necessary. The third part contains the history of twenty cases illustrative of the disease, and of the practice which he recommends.

Editions.—Edinburgh, 1753, 8vo. This book was reprinted in Holland.

Reviewed.—Monthly Review, vol. ix. p. 429.

1759. *Medical Facts and Experiments*. By Francis Home, M.D. London, 8vo.

Dr Home was the third son of James Home, Esq. of Eccles, and was born on the 9th of November 1719. He received a liberal education, having been destined for the Scottish Church; but, on resolving to study medicine, he was placed as apprentice to Mr Rattray, at that time a famous surgeon in Edinburgh. On the expiration of his apprenticeship he attended the medical classes in the University; and was, in the year 1742, appointed to Sir John Cope's regiment of dragoons, which was then on service in Flanders. He served abroad during the whole of the war, till the peace of 1748; shortly after which he quitted the army, and settled as a practitioner in Edinburgh, where he took his degree in 1750. In 1751 he became a licentiate, and in the following year a fellow of the College of Physicians. In 1768 he was appointed professor of *materia medica*, which chair, in 1798, he resigned in favour of his son, Dr James Home, the late professor of the practice of physic. The father died on the 15th of February 1813, at the advanced age of 93. (Bower's History of the University of Edinburgh, vol. iii. p. 120.)

We rather trust to a physician who admits that for some cases his art avails nothing, than to another who boasts of infallibility. We therefore look to Dr Home for a candid statement in his "*Facts and Experiments*;" for, although the practice may now have gone almost entirely out of fashion, he has not scrupled to publish his fallibility—most of the cases which he has detailed having terminated fatally. But, in thus proclaiming his want of success, he was influenced by excellent motives: unsuccessful cases "afford the fullest picture of the disease, as they often teach more than those which have a contrary issue, as they show the fallacy of trusting to a few observations in the cure of diseases, as they teach us not to be too sanguine in our hopes and promises, and as they will at least procure credit, which has not always happened to cases that were most successful." His work is of value in another aspect; it contains descriptions of diseases which occurred among the British troops in the Low Countries, and which are either only slightly mentioned, or passed over in silence, by Sir John Pringle in his valuable *Observations on the Diseases of the Army*.

Dr Home's work consists of three parts. The first contains a history of epidemics; the second is composed of detached cases of various diseases; and in the third part we have an account of some physiological and therapeutical experiments. The description of the epidemic fevers which raged in the continental army in the years 1742, 1743, and 1748, are reckoned faithful and accurate. On the subject of gun-shot wounds he has left some instructive observations. The mode of treating these accidents, as here laid down, does not materially differ from that of Mr Ranby; he does not appear, however, to have used bark with such a bountiful hand, but recommends it in cases where profuse suppuration is going on. He seems to have practised scarification much too liberally, and tells us that he cut all the wounds which he dressed at the battle of Dettingen. From the consideration of many cases, he has given a most decided testimony in favour of immediate amputation. An operation which he records is worthy of notice. It was the case of a dragoon wounded in the back; and most of the spleen protruding, and having become so inflamed from cold as to render its reduction impossible, Mr Wilson cut away all the viscus which had issued through the wound. The patient, though otherwise much wounded, made a perfect recovery. (P. 3.)

Many of the cases here recorded are extremely interesting; and, from the plan which he had adopted of giving chiefly fatal examples of disease, he is often led to suggest for the consideration of the reader, whether, if one medicine had been employed or another omitted, or if one had been omitted and another substituted, the result of the case would have been different. The most interesting section in the third part, is that which gives a history of the measles as they appeared at Edinburgh in 1758. He was the first who inoculated the measles by applying to an incision in the skin cotton dipped in the blood of a person labouring under the disease. Of those experiments, we have here a full account; and we are

told that eruptive fever, which followed inoculation in six days, was milder, and the lungs were less affected than in the natural disease. The same experiments have been repeated by Vogel, Monro, Rosenstein, and, in 1822, by Speranza of Mantua. All agree as to the possibility of thus communicating the complaint, but there is a difference of opinion as to the mitigation of the symptoms by this means.*

Editions.—*London*. 1759, 8vo. The work was translated into German, *Altenb.* 1768, and into French in 1773.

Reviewed.—*Monthly Review*, vol. xxi. p. 68.

1764. *Economical and Medical Observations, in two parts. From the year 1758 to the year 1763 inclusive. Tending to the improvement of Military Hospitals, and to the Cure of Camp Diseases incident to Soldiers. To which is subjoined an Appendix containing a curious account of the climate and diseases in Africa, upon the great river Senegal, and farther up than the island Senegal : in a letter from Mr Boone, practitioner in physic to that garrison for three years, to Dr Brocklesby.* By Richard Brocklesby, M. D. *London*, 8vo. Pp. 320.

Richard Brocklesby was born on the 11th of August 1722, at Minehead, Somersetshire, his mother's native place, where his parents, who were Quakers, were then paying a visit. His father was an Irishman, and resided in Cork. Richard received his education at the school of Ballymore ; and, being destined for the medical profession, studied at Edinburgh and afterwards at Leyden, at which latter university he graduated in June 1745. He then settled in practice in London, and, in the year 1745, received an honorary degree from the University of Dublin ; and, by virtue of a mandamus degree from Cambridge, became a fellow of the College of Physicians. In 1758, through the influence of Lord Barrington, he was appointed physician to the army, being sent over to Germany, where he served during the greater part of the "Seven Years' War ;" and, about the year 1760, was placed in charge of the hospitals for British troops serving in that country. He returned to London shortly afterwards, and obtained a most lucrative practice, which he enjoyed till the year 1794, when, finding the infirmities of old age stealing upon him, he declined to attend any private patients except his own particular friends, among whom were Burke and Dr Samuel Johnson. A little before this, however, his patron and friend, the Duke of Richmond, had appointed him "Physician General to the Royal Regiment of Artillery and Corps of Engineers ;" an appointment which he still retained, on account of its giving him frequent opportunities of visiting the laboratory at Woolwich. Through his recommendation, a professorship of chemistry was instituted at the royal military college of that town ; and, through his influence likewise, Dr Adair Crawford was elected the first professor. It is stated by Dr Watt, in his *Biographia Britannica*, that Brocklesby had practised

* Gregory's *Theory and Prac. of Med.*, p. 204.

in Sweden before his first settling in London ; and that, as an army physician, he served in America, as well as in Germany ; but these statements are not confirmed by any biographical notice which I have seen. Dr Brocklesby expired suddenly, a few minutes after going to bed, without the least pain or previous illness, on the 11th of December 1797, in the 76th year of his age. He left a considerable fortune, which was divided between his two nephews, the celebrated Dr Thomas Young and Mr Beeby. (*Rees's Cyclopædia*, vol. v. art. Brocklesby. *Encyc. Britan.* vol. v. p. 586. *Hutchinson's Biog. Med.*)

The first part of these "Observations" is of a popular nature, being intended for the perusal of military as well as medical officers, and treats of the qualifications of army physicians and surgeons,—the means of preserving the health of troops,—of hospitals and barracks. The whole of his remarks breathe an excellent spirit towards the private soldier, with a desire to better his condition, and benefit the service at large. We are, however, presented with rather a sad account of the manner in which sick soldiers were treated at this period ; but we may suppose that a work like the one under consideration, written by a man of experience, and pointing out a method of amendment, must have had no inconsiderable influence in recommending a better system.

In discussing the subject of transports, Dr Brocklesby has recorded the outlines of a code of regulations, which he had drawn up by desire of some officers, on the means of preserving the health of soldiers on ship-board—and which had been rigidly adhered to by Brigadier-General Draper during his expedition against Manilla, and had been found to answer "exceedingly well." These regulations are intended to enforce due attention to cleanliness, to ventilation, to the necessary air and exercise, and to a proper diet.

He points out in strong terms the advantages which barracks possess in placing the soldier more under the eye of his officers, and thus rendering him more cleanly in his person, more sober and regular in his habits. But at this period so many regiments were embodied that a considerable proportion of them could not be accommodated in barracks ; he therefore urges the necessity of establishing barracks on an improved plan, for preserving "the lives of numbers of men unprofitably and needlessly lost in this country." Of the qualifications necessary for army medical officers, he speaks at some length. It would appear that the inducements held out to those who entered the service were so small, that few competent men were found willing to offer themselves as candidates for admission ; and the preliminary examinations were so trifling, that "raw youths just emancipated from half of their apprenticeship," if recommended by "some great man," were appointed, as a matter of course. To effect a reform under such circumstances, he proposed that medical commissions, which were then obtained by purchase, should be raised in price, and "fairly and avowedly" sold for L.600 or L.700 ;—that candidates should undergo a strict examination, which, as the diseases of soldiers are more of a medical

than a surgical nature, should bear reference more especially to their knowledge of the practice of physic. He also proposed to allow regimental surgeons an annual pay of L.250, or some sum sufficient to make the situation worthy the acceptance of properly educated gentlemen. His arguments in favour of those changes are forcibly stated; and he proposes to memorialize government on this subject whenever a fitting opportunity should present itself.

The subject of hospitals is next discussed at considerable length, and the total inadequacy of the system of management then followed is fully pointed out. The military hospitals of this period are represented as being low in the ceiling, small, ill-aired, and often damp, or placed in an unwholesome situation; or, if no regular building had been erected for the reception of sick soldiers, untenanted cottages, outhouses, barns, or any buildings of the kind, were fixed upon and converted into temporary hospitals. Of the cruelty and the fatal consequences of such proceedings many examples are produced. Dr Brocklesby had seen a desolated cottage, unfit for containing a wretched family of six or eight persons, destined to hold the sick of a whole regiment.

"I have seen (says he) such a cottage stuffed with forty, fifty, sixty, nay with seventy or eighty poor sick soldiers, all lying heel to head, so closely confined together within their own stinking clothes, foul linen, &c., that it was enough to suffocate the patients, as well as others who were obliged to approach them. In such receptacles for the sick I have frequently observed the simplest inflammatory fever, without the least alarming symptom at the patient's admission, to degenerate, before its crisis, into the spotted and truly petechial fever." (P. 55.) Such occurrences were by no means rare; the facts, as stated by Brocklesby, are confirmed by Monro and Pringle; and hence the justice of a remark of the latter, who observes,—“Among the chief causes of sickness and mortality in an army, the reader will little expect that I should rank (what are intended for its health and preservation) the hospitals themselves, and that on account of the bad air and other inconveniences attending them.” (Preface, p. 8.)

Such being the miserable state of affairs, the remedy is next indicated, and some hints are offered for correcting such serious errors,—errors indicative of a want both of humanity, wisdom, and common sense, since, by such a fearful loss of life, government was subjected to the expense of recruiting, arming, and training an additional set of men, who could not very speedily be rendered fit for service. In some cases he recommends the use of Dr Hales's ventilator, in order to secure a free circulation of air; but if the house destined for the reception of the sick is ill-aired and low in the ceiling, or if it labours under any serious disadvantage, he advises that the men's lives should not be risked in it, but that temporary wooden sheds should be erected. The idea of such a plan was first suggested by the exigencies of a case which occurred in the Isle of Wight during the year 1758. A larger number of sick had been landed than could by any means be accommodated in the spare

cottages, barns, and outhouses around Newport; and there still being a deficiency of room, a temporary building was erected with deal boards, the room being covered with straw to keep out cold and damp. It was high in the ceiling, and contained 120 patients; and, though constructed in a most slovenly manner, and though the weather was both cold and very wet, the patients here recovered sooner than those who were treated in the other hospitals or at their billets. Similar temporary sheds had been employed with the same beneficial results at Guildford in Surrey, in the year 1760, and at Winchester in the year 1761. From the results of those trials—from such sheds being far preferable to most of the fixed hospitals then existing in England—from the facilities they afforded for maintaining perfect cleanliness—and on account of their trifling expense—the ease with which they might be removed to another situation in the event of a contagious disease appearing—from such considerations he was inclined to urge the more general use of these hospitals, and advised that they should be erected in connection with all the fixed camps in Britain, and in connection with naval and military armaments to be employed in tropical or other distant countries. Into this part of his treatise he has introduced a set of regulations which had been followed in the camp hospitals of Great Britain, and were found to answer very well in controlling the patients, and serving as a guide for the administration of the affairs of the sick of regiments.

The diseases incident to military men, which are discussed in the second part, are most of them more fully mentioned by Sir John Pringle; but some disorders are here noticed which the latter has passed over in silence. Brocklesby's observations, moreover, are interesting, not only on account of their own merits, but also because they refer to the same diseases occurring to soldiers in England, which are described by Pringle, Home, and Monro, as incident to the British troops on the Continent. In this part of his work he has confined himself principally to a statement of facts, faithfully recording what he saw, so that the reader is left to draw his own inferences. He aimed at giving for the sake of inexperienced army practitioners, such hints, advices, and cautions as were necessary for the guidance of those who were totally unacquainted with the peculiar habits of soldiers, and also "the most essential, and such practices particularly, as were best adapted to military life." But besides, from the advantages which the army, as a school for the study of medicine, has always presented, he had been enabled to make some trials of the effects of new medicines, and to use others in diseases in which they had not been formerly employed.

In most of the inflammatory diseases he has recommended nitre, so as to keep up copious sweating. This remedy he employed to a very great extent, and often gave "ten or more drachms" during the course of the twenty-four hours. In this manner, after copious bleeding, he treated acute rheumatism, erysipelas, coughs, inflammatory fever, cynanche, &c.; and, he affirms, with most flattering success. His treatment of pleurisy and pneumonia closely resembles that of the present day. He first of all bled the patient copiously, kept him on strict antiphlogistic regimen, and ad-

ministered Huxham's vinous solution of antimony, in doses of from twenty to thirty drops every six hours. He farther employed tartarised antimony, in doses varying from a quarter to half a grain twice or thrice a day, in cases of chronic rheumatism: and of this practice he asserts that it is "the cheapest, and, in his private opinion, the best of all that class of remedies which are usually commended as alteratives; for now and then it seemed to be of service when most other remedies had failed."

Another drug upon whose effects he experimented was opium. This medicine he employed in very large quantity in cases of rheumatism, in which he gave "that preposterous farrago known under the title of Dover's sweating powder, a combination of opium with ipecacuanha." He had, in some cases of dropsy, given to the extent of two scruples of this preparation as a single dose. His usual way of giving it in chronic rheumatism was to order thirty grains every twelve hours for a week together, and "by lying in bed in blankets it produced a more plentiful sweat than can easily be conceived without ocular testimony."

Dr Brocklesby recommended the use of large quantities of port wine in the low stage of the petechial fever. If the pulse was very weak, "a spoonful or more of pure port wine" was administered every half hour, so that in the course of twenty-four hours some patients consumed so much as three pints, and with most decided benefit. We are told that "it frequently supported and raised some men from the jaws of death to new life and vigour after twenty-four hours." Many of his observations on the treatment of disease are worthy of notice, especially his chapters on rheumatism, autumnal diseases, jail fever, small-pox, and lues venerea. On the treatment of this last he says, "from what I have learned, all that is necessary (if attainable at all by mercury) may be obtained from the salutary effects of moderate unctions of mercurial ointment, and from Plummer's alterative pill." (P. 296.) In cases of long standing, and for the cure of secondary symptoms, he had the greatest confidence in sarsaparilla.

Reviewed.—Critical Review, vol. xix. p. 193.

1764. *An Account of the Diseases which were most frequent in the British Military Hospitals in Germany, from January 1761, to the return of the troops to England in March 1763. To which is added, An Essay on the means of preserving the Health of Soldiers, and conducting Military Hospitals.* By Donald Monro, M. D. London, 8vo. Pp. 408.

Dr Monro was born in the year 1729, and was the son of the first Dr Alexander Monro, founder of the Medical School of Edinburgh. He served on the Continent during the protracted war as "Physician to the Army;" and, afterwards settling in London, obtained a lucrative private practice. He acted as physician to the troops encamped at Coxheath, near London, in years 1778 and 1779; and appears afterwards to have been appointed one of the "Physicians General of the Army." He died at London on the 8th of June

1802, at the age of 75. He is the author of a treatise on *Materia Medica*, (Lond. 1788, 4 vols. 8vo), and another on *Mineral Waters*, (Lond. 1770, 2 vols. 8vo,) besides those to be presently mentioned.

Dr Monro's treatise is divided into four parts; the first containing a history of the diseases which occurred among the troops in Germany; the second is the "*Pharmacopœia in usum Nosocomii Militaris Regii Britannici*, 1761;" the third, is an essay on the means of preserving the health of troops; and the fourth discusses the subject of military hospitals. His remarks, although on the same diseases which are discussed by Pringle, Brocklesby, and Home, are interesting from a plan which he has adopted of furnishing illustrations and cases of the same diseases which he had observed in Germany, from his extensive hospital and private practice in London. From having so very commonly observed patients in the petechial fever to be troubled with intestinal worms, he is inclined to believe that in some cases they give rise to a fever "which the bad state of the patient's humours, or the infected air of hospitals, determine to be of this kind." In the majority of cases, however, he supposes that worms are not the "cause of the disease; but, being lodged in the intestines before the fever comes on, they are annoyed by the increase of the heat and the corruption of the humours," and so make their escape. As to the nature of the autumnal remittent fever of Germany, he had formed the same opinion as Sir John Pringle, and remarks, "this is reckoned the endemic distemper of the West Indies, of the coast of Guinea, and other places in the torrid zone; but in those warm countries it appears in a more violent degree, makes a more rapid progress, and proves far more fatal than in our cooler and more temperate climate." He records cases of intermitting fever which, after resisting the use of cinchona, were cured by "powder of chamomile flowers, salt of wormwood, and diaphoretic antimony, and one by the use of the aluminous powder with myrrh."

In the third part we have observations on many subjects of interest to military and medical officers, connected with the means of preserving the health of soldiers on service. These remarks, in short space, embody a great quantity of valuable information, the result of an extensive acquaintance both with what had been written by others, and with the practical details of this branch of the service. Here, first of all, we find some observations on the proper clothing and management of troops during the colder months of the year; and the best expedients for securing the health of soldiers in spring and autumn, when the temperature varies so materially. He likewise enforces the necessity of minute attention to the dieting of troops, especially in winter, in order to secure a plentiful supply of vegetables as preservatives against scurvy, a disease often fearfully prevalent in the armies of those times. For the remarks on the means of preserving the health of soldiers on board transports and on their arrival in hot climates, he is chiefly indebted to the able work of Dr James Lind, Physician to the Navy, "*On the means of Pre-*

serving the Health of Seamen ;" and to conversations which he had held with physicians who had been employed in such services. He adverts to an opinion often entertained both before and since his time, and one of material importance in the treatment of disease, —viz. that Europeans, when labouring under disease in the torrid zone, are not able to suffer blood-letting on account of their blood being "too much dissolved." But with Dr Lind he agrees in pronouncing this notion incorrect ; or, at all events, "sailors, and consequently soldiers, being strong and robust, and exposed to great vicissitudes of heat and cold, and more excesses, and other accidents in general, bear freer bleeding than any other set of people." He next directs our attention to the circumstances which it is necessary to keep in view in selecting ground for an encampment, and the means of preserving the health of troops when in camp. He adverts to the necessity of having a plentiful supply of good water, and gives several plans for purifying bad water. This part of the book concludes with some brief remarks on marching and on guards, with the view of indicating the means of preserving the health of men under such circumstances.

With respect to the general and internal arrangement of military hospitals, the observations of Monro embrace a greater variety of topics, and are more minute than those of Brocklesby. Most of his remarks evince much good sense, and a just appreciation of the advantages which result to the soldier, and the service at large, from such institutions. Most of his observations have a reference to general hospitals. His attention is first directed to the buildings most suitable for hospitals ; and he recommends houses, "with large, dry airy apartments, situated on high ground, where there is a free circulation of air, and a command of water." The great necessity of cleanliness is strongly enforced. The advantages of thorough ventilation are fully explained, and several plans for securing this desirable object are discussed. On the subject of the diet of the sick, he adds a few remarks, and has specified a judicious selection of food for invalids. Here he introduces Diet Tables, which he proposes to be adopted in Military Hospitals.

When troops are sent on service, it is his recommendation that, in addition to the common hospital ships, there should be another properly fitted up for the reception of sick officers. He farther advises, that in expeditions or sieges, the wooden sheds proposed by Dr Brocklesby should be erected for the accommodation of the sick. Then follow an account of the necessary internal arrangements for hospitals, and a code of regulations for the maintenance of good order, and for the direction of nurses and patients ; with regulations for a convalescent hospital, a very necessary appendage to a general hospital, in order to draw off "the recovered men, who are always the most riotous." The remainder of the work is occupied with remarks on the medical officers attached to hospitals, with a statement of their respective duties. With the view of more effectually preserving the necessary discipline in great general hospitals, he proposes to appoint an officer, called "Military

Inspector or Commander," whose duty should be to take charge of all convalescents—to look after the wards to see that they are clean—to see that the diet is proper—to see that all the officers, nurses, and servants do their duty—to receive regular reports of the sick—to look after the property of such patients as die—and to manage many other details connected with the establishment.

It is worthy of particular remark, that *Monro*, as well as *Pringle*, *Brocklesby*, and *Home*, was in the habit of examining the dead bodies of their patients at this time, when such a practice was by no means general even in civil hospitals.

Editions.—*London*. 1764, 8vo. *London*. 1780, 2 vols. 8vo. The second edition had the title changed, "*Observations on the means of Preserving the Health of Soldiers, &c.*"

Reviewed.—*Critical Review*, vol. xix. p. 143. *Monthly Review*, vol. xxxv. p. 306.

1777. *An Account of the Treatment of the Bilious Remitting Fevers in the Military Hospitals at Martinico in 1761; in a Letter from Dr George Monro to Dr Donald Monro, Jermyn Street, London, &c.* *London*. 8vo.

While *Dr George Monro* was serving with the army in the *West Indies* during the time of the war, a very large number of the soldiers were attacked with a bilious fever of "the autumnal kind, but of a much more malignant nature than it occurs in *Europe*." Having observed, from the examination of fatal cases, that the intestines were filled with putrid bile, he supposed that the most effectual plan of cure would be to "evacuate speedily the corrupted humours;" and hence his practice chiefly consists of the employment of bleeding, purgatives, and emetics.

Reviewed.—*Duncan's Medical Commentaries*, vol. v. p. 254.

1780. *Observations on the means of Preserving the Health of Soldiers, and of conducting Military Hospitals; and on the Diseases incident to Soldiers in the time of service, and on the same diseases as they appeared in London.* By *Donald Monro, M. D.* *London*. 2 vols. 8vo.

This is a second edition of *Dr Monro's* "*Observations*," greatly enlarged, and considerably improved; for much of the information contained in the first edition is not in a very tangible form, on account of the want of any proper arrangement, and on account of the book having no index. The present work consists of five parts. The first is on the means of preserving the health of soldiers; the second, on military hospitals; the third is not to be found in the first edition, and contains an account of the health and diseases of the troops encamped at *Coxheath* in the years 1778 and 1779; the fourth part is on the diseases of troops on service; and the fifth is a pharmacopœia adapted for the use of *Military Hospitals*.

The first part, besides many essential additions, contains a section not in the first edition, relating to the "proper seasons for troops going on expeditions to sail from *Great Britain*, and to

land in different parts of the world." A judicious proposal is contained in the tenth section of the second part. Seeing that many of the men on active service, especially in warm climates, have their constitutions weakened by dysenteries, fevers, and other disorders, which render them of no use, but merely an encumbrance to an army, he advises that, on the breaking out of a war, two or three companies should be added to each corps proceeding on service; and these companies remaining at home might not only recruit for the regiment, but serve as a defence to the kingdom. At the end of the campaign, or as opportunities presented, the regiment on service might exchange those men who were weakened by disease for others from the home companies who were healthy and strong; while many of the sick, by remaining at home for a year or so, where the duty was easy, might recover their strength sufficiently so as again to be prepared for service.* Another addition to the original publication is the last section of the second part, which gives an account of the manner in which the hospital arrangements were conducted in England at the fixed camp of Coxheath in the years 1778 and 1779. It also contains a copy of *Instructions* furnished by himself, as physician, to regimental surgeons, relative to the management of the sick and hospitals of their respective corps.

The third part is altogether new, and contains a short account of the health and diseases of the troops which were encamped at Coxheath. Here we find a meteorological history of the weather, with the view of illustrating the prevalence of different maladies, and several numerical statements as to the diseases observed during the time of the encampment. The sick, who required it, were treated in regimental hospitals, and the surgeons were enjoined to make regular returns to Dr Monro. It was his duty, as physician, to pay frequent visits to the different hospitals, and to see such cases as were thought dangerous, or in which his assistance was asked by a medical officer. The fourth part, which relates to the diseases of soldiers, is very much enlarged from the first edition; and two diseases are discussed which are not mentioned in the former publication, namely, putrid ulcerated sore throat, and lues venerea.

Editions. Lond. 1780, 2 vols. 8vo. Translated into German, Altenburg, 1784, 8vo.

Reviewed. Monthly Review, vol. lxiii. p. 473. Critical Review, vol. xlix. p. 456.

1781. A brief History of the late Expedition against Fort San Juan, as far as relates to the Diseases of the Troops; together with some Observations on Climate, Infection, and Contagion, and several of the Epidemic Complaints of the West Indies. By Thomas Dancer, M. D. London, 4to.

In this little treatise, Dr Dancer, who had been physician to the

* This plan is now followed, to a certain extent, with regiments serving in most of our colonies. They have so many, usually six, *service companies* abroad, and so many *dépôt companies* at home.

troops sent against Fort San Juan, gives an account of the health and diseases of the soldiers employed on that service, with such a detail of the military operations as is necessarily connected with the author's principal design. Dr Dancer is also the author of the "Medical Assistant, or Jamaica Practice of Physic,"* and of "Strictures on Dr D. Grant's Essay on Yellow Fever," in both of which publications many interesting remarks are contained. (Critical Review, vol. liv. p. 74.)

1781. *Observations on the Dysentery of the West Indies ; with a successful method of treating it.* By Benjamin Moseley, M. D. Lond. 8vo.

Dr Moseley was born in the county of Essex, and received his professional education at London and Paris. Having settled as a practitioner in Jamaica, he received the appointment of surgeon-general to the troops serving in that island. In 1785 he came to London, and in 1788, on the death of Dr Monsey, was appointed Physician to Chelsea Hospital, which situation he filled till near the time of his death in June 1819.† He was one of a very small number who strenuously opposed the introduction of vaccination by Dr Jenner, and on this subject he published several pamphlets ridiculing the many supporters of this innovation on long established practice. (Annual Orbis for 1821, p. 239. Faulkner's Description of Chelsea, vol. ii. p. 272.)

His method of treating dysentery proceeds upon the correctness of the opinion of Sydenham, that this disease was a fever of the intestines, and that the general cause of it, as of all other fevers, was obstructed perspiration ; and hence, according to Dr Moseley, the "cure consists in turning back the circulation to the surface of the body, and increasing the sensible perspiration by the most active sudorifics."

Editions.—This work was first published at Kingston in Jamaica, and was several times reprinted in the West Indies, and in different parts of Europe. It is reprinted in his *Treatise on Tropical Diseases*, published in 1787.

Reviewed.—Monthly Review, vol. lxvi. p. 153.

1781. *Observations on the Diseases which appeared in the Army at St Lucia in 1778 and 1779 : to which are prefixed*

* Kingston, 1801. 4to.

† Allusion having been made, on more than one occasion, to the medical officers of Chelsea Hospital, it may not be uninteresting here to give a list of their names and the dates of their appointments from the foundation of the hospital. *Physicians*, John Smart, M. D., 1715 ; Geo. Lewis Theissier, M. D., 1740 ; Messenger Monsey, M. D., 1742 ; Benjamin Moseley, M. D., 1788 ; William Somerville, M. D., 1819. *Surgeons*, John Noddes, 1702 ; Alex. Inglis, 1715 ; Wm. Cheselden, 1737 ; John Ranby, 1752 ; Robt. Adair, 1773 ; Thos. Keate, 1790 ; Sir Everard Home, 1821. *Apothecaries*, Isaac Garnier, 1702 ; Dan. Graham, 1739 ; Rob. Graham, 1747 ; Rich. Rob. Graham,—Wm. North, 1816. On the death of Sir E. Home in 1832, the appointment of surgeon was united to that of physician, and Dr Somerville became Physician and Surgeon to the hospital ; being succeeded by Dr D. MacLachlan in 1840.

Remarks calculated to assist in ascertaining the causes and in explaining the treatment of these diseases. With an appendix containing a short address to military gentlemen, on the Means of preserving Health in the West Indies. By John Rollo, M. D. London, 12mo. Pp. 160.

The sickness and mortality among the troops, soon after their landing in the island of St Lucia in the West Indies, was so alarming as to excite the most serious consideration of both the military and medical officers present. Several points of interest connected with these subjects are discussed in this little volume, which is divided into two parts; the first containing observations calculated to assist in ascertaining the causes and explaining the treatment of the diseases of the army at St Lucia, in December 1778, January, February, March, April, and May 1779; while the second part consists of observations on the diseases which appeared in the army during the same period. Relapses, which proved so common in all the diseases of the army of St Lucia, are no doubt ascribed by Dr Rollo to their proper causes, namely, the diet, consisting of salt beef,—the necessity of sending convalescents early to duty,—and the impossibility of sending them to healthy stations during recovery. The observations contained in his "Address to Military Gentlemen" were repeated, and at the same time confirmed and enlarged, in a little work published in the year 1783.

Reviewed.—Critical Review, vol. liii. p. 78.

(*To be continued.*)

ART. III.—*Observations on the Formation of Bone by the Periosteum.* By ALEXANDER WATSON, M.D., F.R.C.S.E., Consulting Surgeon to the Royal Infirmary of Edinburgh, &c

It was long believed that the periosteum not only conveyed nourishment to the bone which it enveloped, but also mainly, if not solely, contributed to the reproduction of bone, in cases of necrosis and fracture.

This opinion was founded on the observation of certain facts, which are certainly now to be considered rather limited and inconclusive.

In later times, however, the accuracy of this opinion has been called in question, and Professor Müller of Berlin says, that "the periosteum has nothing to do with the reproduction of the bone;" and he has denounced it as a "barbarism" in physiology to ascribe to the periosteum the capability of forming bone.*

The followers of the German physiologists maintain the doctrine, which was also that of Sir C. Bell, "that bone only produces bone." In proof of this, they state, that the periosteum, having no such function, has therefore not the power to produce bone. They further state, in regard to the regeneration of bone,

* Müller's Physiology, Trans. p. 388, and 427.

that, in cases of necrosis, minute portions of the old bone are separated from it before it becomes dead ; which, continuing adherent to the periosteum, retain their vitality, and form the nuclei from which the new bone originates and grows.

In consequence of these very opposite opinions on this subject, I have thought it worthy of further investigation ; and have therefore selected a few cases for the purpose of minute examination, such as I considered likely to contribute to the elucidation of the question at issue ; which, it will be observed, now seems to be, whether or not the periosteum has the capability or power to form new bone in cases of necrosis and fracture.

My attention in prosecuting this investigation was first directed to ascertain the correctness of the statement regarding the separation of portions from the surface of the old bone in cases of necrosis. For this purpose, therefore, I examined the following case, in which the reproductive process was in a very early stage.

CASE I.—*Of the formation of new bone in acute necrosis of the tibia.*—This occurred in a boy, 12 years of age, whose leg I amputated some weeks after the commencement of the disease. The periosteum was found to be thickened and separated from nearly the whole of the anterior part of the tibia, which had become dead.* The exposed surface of the bone was smooth, except at a few points where there were irregular depressions or superficial ragged excavations, as if small portions of the bone had been corroded, (Plate II. Fig. 1.) From such excavations as these, it has been alleged that portions of the original bone have been separated ; and their vitality being preserved (as is supposed) by their continuing adherent to the periosteum, they become the nuclei by which the new bone is formed ; a process which would tend to support the theory, that bone only produces bone.

In order to ascertain the truth of this theory, I removed a portion from the inner surface of the periosteum, opposite to the largest of the depressions above described. Upon the surface of this portion of periosteum, the separated portions from the old bone should be found, which form the nuclei from which the new bone is developed. But a careful examination of this preparation, either with or without the microscope, shows that no such separated portions of bone exist. The inner surface of the periosteum was quite smooth and entire ; but at several parts of its texture after its inner surface was removed, there are minute portions of new bone of different sizes, which may be seen by the microscope, (Fig. 3.) At other parts of the periosteum, new bone is found in considerable masses, which are either covered on

* See preparation in Royal College of Surgeons' Museum, No. 2228.

both sides by this membrane, or, having periosteum on one side, are adherent to that part of the old bone which had not become dead. These masses of new bone are formed by the new osseous deposits enlarging, and coalescing so as to form a spongy-like mass, (Fig. 4.)

This case, therefore, completely disproves two statements or theories which have been advanced, viz. 1st, That new bone is formed by portions of the old bone which remain alive, become detached from it, and continue adherent to the periosteum. 2d, That the periosteum does not of itself form bone. By a careful examination of this case, it is obvious that neither of these positions are verified, and consequently are incorrect.

CASE II.—Of the formation of new bone after fracture of the femur.—The subject of this case was a youth, 18 years of age, who received a fracture of his thigh bone near to the knee joint, for which he became a patient of the Royal Infirmary, under the care of Dr Handyside. Three months after the receipt of the injury, extensive suppurations formed, the extremity of the upper portion of the femur protruded, was in a dead state, and was undergoing the process of exfoliation. The state of the limb and of the patient's general health having rendered amputation necessary, I had an opportunity, through the kindness of Dr Handyside, of examining the state of the fractured extremities of the bone and of the periosteum connected with it. The only point, however, to which I have occasion to allude at present is, in regard to the origin and growth of the new bone formed at the situation of the fracture.

The broken extremities of the femur were surrounded by a mass of new bone, except at the part which had become dead and was exfoliating. This mass of new bone upon the upper extremity of the femur was from one to two inches in length, and nearly a quarter of an inch thick at some parts. Its surface was uneven, and was covered by a membrane externally, which consisted of a layer of the periosteum continued over it; while other layers of this membrane either formed part of its structure or passed underneath it. That part of the new bone next to the fracture, adhered firmly and intimately to the old bone by the indentation of spiculæ, without any membrane being interposed. The new bone gradually lessened in thickness as it receded from the fracture, till it consisted only of minute points of bone in the substance of the periosteum; while at the same time its adhesion was less intimate to the old bone, having a layer of the periosteum interposed.

The new bone, therefore, which surrounded the extremity of the old bone, when examined and traced downwards from the shaft of

the bone, seemed to be enclosed in the periosteal covering, which had been gradually expanded so as to increase in thickness towards the fracture, by the continued growth of the new bone.

On examining the periosteum about an inch above the commencement of the mass of new bone, numerous osseous points (visible only by being magnified by the microscope two or three hundred times), can be seen in the substance of the membrane after it has been split into layers, or cut into transverse sections, and rendered transparent by being dried.

Proceeding downwards, the bony points, becoming larger, are visible to the naked eye, (Fig. 6.) They also become more numerous, and, by increasing in size, coalesced so as to form spiculæ of new bone, having layers of the periosteum interposed.

The process which these facts reveal to us consists, *1st*, of increased thickness of the periosteum; *2dly*, of the deposition of minute points of osseous matter into its substance, by which it is separated into layers; *3dly*, of the gradual increase in the size of these osseous points till they coalesce, thereby compressing or causing the absorption of some of the layers of the periosteum; *4thly*, of the adhesion of the periosteum, loaded with osseous matter, to the old bone; *5thly*, of the gradual absorption of the inner layer of the periosteum, by the indentation of processes or spiculæ of the new bone into the old bone, by which they become incorporated.

All the points and masses of new bone are distinctly formed in the substance of the periosteum, not upon its surface. Their first appearance is that of a fine microscopic net-work, which gradually increases and assumes the texture of perfect bone. And, it is very remarkable, and very distinct in several of the preparations I have made, that these points of new bone are, in many parts, found close to the sides of blood-vessels.

From what has been said it will be obvious that this case, by coinciding so completely in its details with the preceding one, confirms completely the views there stated, as to bone being formed in the substance of the periosteum without assistance from the old bone by separated portions or otherwise.

CASE III.—In another case of fracture of the tibia and fibula, near to the ankle-joint, where the patient, (a man about thirty-five years of age,) died from erysipelas under my care in the Royal Infirmary, five or six weeks after the injury, I examined minutely the state of the periosteum, both of the fractured tibia and fibula.

In this case I found the periosteum at the fracture much thickened, by its texture being so filled with osseous matter, that it could scarcely be cut with a knife, (Figs. 2 and 5.) A thin vertical section of it, when dried, seemed to consist almost en-

tirely of bone, and was effecting the reunion of the fractured parts.* The same appearances were observed in this which I have already described in the preceding case.

I might here adduce several other similar cases which I have examined, in proof and illustration of the observations I have made, but deem this quite unnecessary.

Before concluding this part of the subject, I may mention two or three other circumstances which are very remarkable. 1. When the broken extremities of a bone overlap each other, the formation of new bone takes place only at the parts required, being almost entirely on the sides of the broken bones, next each other, and even although they may be at a considerable distance apart. Two very remarkable examples of this are delineated in the plate, Figs. 7 and 8. 2. When a fracture takes place through the shaft of a bone extending into a joint, the formation of new bone stops where the periosteum terminates at the joint; an example of this, in the case of a fracture of the femur into the knee-joint, is now before me. Cases of this kind constitute negative evidence of the agency of the periosteum in the production of new bone. 3. In fractures of the neck of the femur, the peculiar structure of the periosteal membrane of the cervix and its laceration seem to be the chief causes of want of bony union.

CASE IV.—*Of the formation of new bone after the removal of a portion of the cranium by fracture.*—It has been asserted that, in cases of this kind, new bone is either not formed to fill up the chasm, or if it ever becomes occupied by new bone, this is formed by the gradual extension of the old bone from the sides of the aperture.

In the Pathological Museum at Vienna, under the charge of Professor Rokitanski, I lately had an opportunity of examining three specimens of fracture of the skull, with considerable apertures, caused by the removal of fractured portions of the bone. In these cases the patients had died, when the occupation of the apertures, by new bone, had been in progress, and was considerably advanced. In each of them a firm membrane occupied the opening; but whether this was the original periosteum or a new periosteal membrane, it is not easy to determine, from the preparations having been so carefully cleaned and dried. New bone also fills up the apertures to a considerable extent. This is evidently formed partly by extension from the old bone at the circumference of the aperture, and partly by ossification, obviously commencing at the centre of the membrane, by which it was at first occupied. I have in my possession a drawing from one of these cases, and minute portions of the new bone for microscopic examination, (Fig. 9.)

* See preparation in Royal College of Surgeons, No. 2226.

From the foregoing observations the following inferences may be drawn:—

1. That the theories alleging that new bone is formed only by the living parts of the old bone, in cases of necrosis and fracture, are incorrect.

2. That the periosteum has evidently the power to produce new bone of itself, without the aid of the old bone.

3. That the formation of new bone by the periosteum consists, at first, in the deposition of osseous matter in the form of a fine microscopic net-work; and, therefore, that the Haversian canals are only a secondary, not a primary formation in osseous tissue.

4. That in cases of necrosis and fracture, the process of reproduction of bone by the periosteum is the same.

These observations were lately communicated to the Medico-Chirurgical Society of Edinburgh, and the preparations illustrating them were then exhibited.

Explanation of Plate II.

Fig. 1. Represents a portion of the tibia in a case of acute necrosis, showing the depressions which occur on its surface, probably from ulceration or absorption before it becomes dead. The portions of periosteum referred to above, and represented in Figs. 3 and 4, were removed from the part indicated at *a*.

Fig. 2. Portions of fractured tibia, from one side of the bone, referred to in Case III. *a*, *b*, and *c*, *d*, are the portions of broken bone; *e*, *c*, the periosteum of the upper portion thickened, filled with ossific matter, and connecting the broken fragments. The periosteum of the lower portion of bone is unchanged.

Fig. 3. Ossific points formed in the substance of the periosteum in case of acute necrosis, as seen by the microscope, and magnified 250 times. The ossifications, being opaque, look black in the field of the microscope, when examined by transmitted light.

Fig. 4. A portion of new bone from the same case, in which ossification is further advanced, magnified about 150 times. Here the ossifications have coalesced, so as to form a spongy-like mass.

Fig. 5. Ossific points as seen in a thin vertical section of the periosteum in case of fractured tibia, at a part selected for being least advanced, magnified 150 times.

Fig. 6. Ossific points in periosteum of their natural size, from cases of fracture of the femur. In order to be seen, the periosteum was split into two layers, and rendered transparent by being dried on a piece of glass. The extremity marked by the letter *a* is the layer which was next to the bone, *b* the external layer.

Figs. 7 and 8. Two irregularly united thigh bones, in which the new osseous matter has been deposited only on the sides when it was required to form the union. From the Hunterian Museum, Glasgow.

Fig. 9. Aperture in cranium occupied by membrane, in the centre of which new bone is formed.

51, *Queen Street*,
Edinburgh, January 1845.

ART. IV.—On the Bones. Part I. Chemical Constitution of the Bones of the Vertebrated Animals. By JAMES STARK, M. D., F. R. S. E., Fellow of the Royal College of Physicians of Edinburgh.

NOTWITHSTANDING the attention which has in all ages been paid to the bones, and the recent investigations into their minute structure by means of the microscope, much still remains to be known regarding them. At the present day, indeed, we have no series of experiments which indicates the proportional amount of earthy and of animal matters in the bones of the different classes of vertebrated animals; we are still ignorant of the mode in which these two substances are associated together so as to compose the solid tissue of bone; we have even no very satisfactory or unchallenged experiments or observations on their general structure; and even the microscopists are far from being agreed as to the true nature of what they style bone corpuscles and bone cells, or of what they term the intercellular substance.

It is with the view of, in some measure, supplying these and various other deficiencies that I purpose to draw up a series of short papers, in which each of these subjects will be severally reviewed; and the results at which I have arrived, from a very numerous and extended series of experiments and observations, extending over a period of many years, will be detailed.

The first part of this paper will therefore be devoted to the consideration of the proportional amount of earthy and of animal matters in the bones of the different classes of the vertebrated animals, and to a few conclusions which may be deduced therefrom.

The experiments of all chemists have demonstrated that bones are composed of earthy and of animal matters,—the animal matter being a variety of gelatin (collin) capable of being converted into a jelly by boiling in water,—the earthy matters consisting chiefly of phosphate of lime, with varying but small proportions of carbonate of lime, salts of potash, soda, &c. Human bones are those which have been most frequently analyzed; indeed, there have not been published much above half a-dozen analyses of the bones of the inferior animals.

On looking over many of these analyses, it has appeared to me that the discordant results at which different analysts have arrived arose, in some cases, from their not having sufficiently dried the bone previous to analyzing it; in others, from not depriving it of all the fat or oil contained within its cellular structure. This, indeed, is rendered quite apparent from a reference to the mode of analysis employed by not a few of these experimentalists.

They simply removed the marrow, wiped the bone clean, dried it till it ceased to lose weight, and then burned it till the whole animal matter was destroyed. It is scarcely, however, to be wondered at that these experimentalists have been led to overlook the existence of fat in bones, (excepting always the marrow,) seeing that some few anatomists, of no mean reputation, have denied that bones contain any fat or oil, excepting that which exists as marrow in the central cavity of the cylindrical bones of the extremities.

Fat or oil, however, I have found present in all bones; even the dense shaft of the cylindrical bones of the extremities contains a notable proportion; and the quantity progressively increases as we approach their spongy extremities. Fat or oil, however, is far from being confined, as some suppose, to the cylindrical bones; it exists in greater or less quantity in the cancellated structure of all the bones of the body,—in the vertebræ, scapula, ribs, pelvis, skull, carpal and metacarpal, tarsal and metatarsal, and digital bones; nay, it is found even in the sesamoid bones themselves.

As it appeared to me that this agent performed to the bones a more important office than has been usually imagined, I made a few experiments for the purpose of ascertaining the approximative amount of fatty or oily matter contained in a few of the bones of animals. The following table exhibits the results of these analyses.

100 parts of dry recent bones contain of	Bone.	Fat.
Pastern of sheep, - - - - -	75.0	25.0
Pastern of another sheep, - - - - -	82.6	17.4
Radius of sheep, articular extremity and half of shaft, -	78.3	21.7
Canon bone of sheep, - - - - -	84.5	15.6
Radius of other sheep, whole bone exclusive of marrow,	86.5	13.5
Solid shaft canon bone of sheep, - - - - -	95.7	4.3
Pastern of sheep, whole bone, - - - - -	85.5	14.5
Cuboid bone of sheep, - - - - -	84.0	16.0
Internal section radius of ox, including the articular extremity, exclusive of marrow, but including condyles,	81.2	18.8
Internal section radius of ox, including articular extremity, but exclusive of marrow or condyles, - - - - -	77.2	22.8
Pelvis of ox, - - - - -	82.3	17.7
Articular surface and solid shaft of tibia of ox, exclusive of marrow, - - - - -	84.8	15.2
Another tibia of ox, section through articular extremity, exclusive of marrow, - - - - -	80.3	19.7
Another tibia of ox, section through articular surface, (knee-joint,) exclusive of marrow, - - - - -	84.8	15.2
Radius of ox, including articular surface, but exclusive of marrow, - - - - -	81.0	19.0
Human digital bone, - - - - -	70.8	29.2
Human carpal bone, - - - - -	86.3	13.7
Human lumbar vertebra, - - - - -	81.7	18.3
Human lumbar vertebra, (another subject,) - - - - -	85.0	15.0
Turbot vertebræ, - - - - -	92.1	7.9

From this table, which I might have extended to much greater length, seeing that I have performed thirty-seven experiments on the subject, it is apparent that bones contain from 4 to 25 per cent. of fat or oil. This fat or oil is quite independent of the central marrow, and is abundant in bones which contain no central cavity. This fat in the bones does not contribute directly to their strength, yet its invariable presence renders it manifest that it must serve some useful purpose in the animal economy.

If, instead of the proportional weight of fatty to solid osseous matter, we take the volumes which each occupies in the bone, it will be apparent that the fat occupies from a sixth to a half of the volume of the solid bony part itself. It is to be observed, however, that in all the above experiments the central marrow was not included in the calculation; it was thoroughly removed before the amount of fatty matter existing in the bone itself was ascertained. Bones, therefore, contrary to the published opinion of a recent eminent anatomist, do contain a large proportion of fat,—a proportion much larger than seems ever to have been conceived by any inquirer,—an amount, especially when including the marrow, equal in some bones to the whole volume of the solid dry osseous structure.

It is now very generally recognised that the bones of birds are hollow, and that their cancellated structure, instead of being filled with marrow or fat, is filled with air. All the bones of the body are not, however, thus empty, nor in young birds is almost any bone of the body in this state. As I have had occasion to examine minutely the bones of very many different species of birds at all ages, I have had the fullest opportunity of ascertaining the fact, and I find that the bones of almost all birds under one year old are filled with an oleo-albuminous matter, which, as the bird gets older, is gradually absorbed. It has appeared to me that this oleo-albuminous matter filled the interior of the cellular bones of birds nearly as long as they continued to increase in dimensions, and that it was only absorbed after the full adult dimensions were attained. The leg bones of most birds, even those of an advanced age, contain much fat and marrow. The following very short table will exhibit these facts:—

100 parts of dry recent bones contain of	Bone.	Fat.
Golden eagle, thigh bone,	-	85.1
Common brown owl (aged), humerus,	98.7	1.3
Common brown owl (young), humerus,	88.2	11.8
Sea mew (aged), humerus,	-	97.3
Sea mew (young), humerus,	-	89.1
Silver pheasant (aged), radius,	-	98.6
Silver pheasant (young), radius,	86.0	16.0

In a few human bones it was observed that the marrow or fat had become partially degenerated, and assumed an oleo-albuminous character. This change was chiefly remarked in the bones of

those individuals who were of an advanced age, and in those who died of lingering diseases. Indeed, in one case, the fatty matter in the cellular cavities of the bones, and the central marrow, presented the same albumino-gelatinous appearance, which I have sometimes seen attending that disease of the bones known by the name of malacosteon or softening, and is also seen in some cases of rickets.

Some bones of the body contain at all times a much less amount of fatty matters than others. The ribs of the mammalia are notable instances of this, and then the place of the fat is supplied by an oleo-albuminous matter. In many instances, however, perhaps to a greater or lesser extent in all who have attained the adult age, many of the cellular cavities containing this matter are found half-empty; or, in other words, the ribs approach in their nature the bones of adult birds.

In fishes, again, the fatty or oily matter of the bones is almost solely confined to the vertebrae and a few bones of the head or shoulder. In the other bones the cellular spaces are either filled with an albumino-gelatinous matter, or with a watery saline fluid. From this circumstance, the bones of fishes lose upwards of three-fourths of their weight in drying, and instead of being opaque, like other bones, are nearly transparent.

The probable uses and mode of distribution of this fatty matter will be alluded to afterwards when treating of the minute structure of bone.

Many experiments were made for the purpose of ascertaining the amount of moisture in bones. As a general rule the bones of fishes contain the largest amount of water, from one-half to four-fifths of the weight of the fresh bone consisting of water. This is easily understood when it is recollected that the cellular spaces of most of the bones of fishes are filled with a saline fluid, or with an albumino-gelatinous matter.

The bones of birds contain also a considerable amount of moisture; but those of young birds a much larger proportion than those of the aged, on account of their interior being filled with an oleo-albuminous matter, which gives out a large amount of water in drying. It was found that the bones of birds contained from 12 to 25 per cent. of water.

The flat bones of the mammalia, as a general rule, contain a larger amount of water than the cylindrical bones of the extremities. This depends on the larger proportion of membranes and vessels, as well as on the frequent existence of oleo-albuminous matter in their cancellated structure. Flat bones, and the spongy extremities of the cylindrical bones, lost in general from 12 to 20 per cent. of water; while the shafts of the cylindrical bones of the extremities, according to their density, lost only from 8 to 7

per cent. of their weight. This fact seemed to show that the quantity of moisture in bone bore a certain proportion to the amount of membrane lining its cellular interior. The fewer the cellular spaces, or the more solid the bone, the less was the proportion of watery fluid; the more spongy the bone, the greater was the relative per centage of water.

As a general rule it was found that the bones of man contained the greatest amount of moisture of all the mammalia, often exceeding in proportion that observed in the bones of young birds. In a very few cases in which this proportion was notably increased, I was able to trace it to a morbid change in the fatty matter of the bone, a change probably induced by the disease of which the person had died. In fact the marrow and fatty matter appeared to have undergone that oleo-albuminous degeneration which was above alluded to.

The amount of animal membrane and blood-vessels contained in recent bones was ascertained to vary from 1 to 3 per cent. In a few ribs so much as 4 per cent. was more than once noticed; but this is probably an exception to the general rule. In the solid shaft of the leg-bone of the sheep and deer, the per centage never appeared to exceed $\frac{1}{2}$ of a per cent.

The next point of importance was to ascertain the average relative amount of earthy and of animal matters in the solid, dry, cleaned bones of the various classes of vertebrated animals. Naturalists and comparative anatomists in their search after a progressive and more perfect development of all organs as we ascend in the scale of creation, have, in so far as the bones are concerned, allowed their fancies too free play, and asserted that the proportion of earthy salts in the bones increases from the lowest of the fishes to the most highly organized of the birds, in which animals they assume that these tissues are most perfectly ossified.

The statement that the bones of the higher classes of animals contain a larger proportion of earthy salts, is not by every writer expressed in exactly the same terms. Most of them simply state that bones are more perfectly ossified in reptiles than in fishes, and more perfectly in the higher classes than in reptiles; and they then refer as instances to the cartilaginous skeleton of the lowest classes of fishes becoming more and more infiltrated with osseous matter as we ascend in the scale of beings.

Dr Grant, however, one of the first authorities of the present day, more explicitly states the views of comparative anatomists on this point. After referring to the analysis by Chevreul of the skeleton of the *Squalus maximus*, which shewed it to contain scarcely any earthy salts, he remarks, that the proportion of earthy matter which gives solidity to the bones increases as we ascend in the scale of creation, that "it is still further advanced in the

reptiles, further in the quadrupeds, and the densest osseous textures of all the vertebrata are met with in the class of birds.”*

Again, in speaking of reptiles, he says, “As we ascend from fishes through the cold-blooded, air-breathing, vertebrated animals, the texture of the bones becomes, from the greater abundance of insoluble phosphates, more compact, less transparent, firmer, and altogether more solid and ossified.” And again, “In the lowest of the amphibious animals the bones contain most animal matter, are more soft and flexible,” &c.†

When speaking of birds, he says, “In the texture and composition of bones, the class of birds has arrived at the maximum of development known in the animal kingdom. We have seen, from the lowest of the cartilaginous fishes, the bones gaining in the proportion of their solid parts, and consequently diminishing in the proportion of their animal matter.”‡

And lastly, in speaking of the bones of quadrupeds, he says, “There is a greater proportion of animal matter in them than in the bones of birds; they are thus tougher, less brittle, and, by their greater thickness, they are stronger.”§

Such, then, is the statement of comparative anatomists on this point. Knowing, therefore, of no series of experiments which bore out such statements; knowing that, with the exception of human bones, not a dozen experiments had been recorded of the proportion of earthy salts and of animal matter in the bones of the vertebrated animals, I performed the following series of experiments. The following table|| exhibits, I believe, the largest amount of results of the analysis of bones yet published, and is classified according as the animals belong to the mammalia, birds, reptiles, and fishes.

MAMMALIA.

MAN.		Earth.	Cartilage.
1.	Human jaw-bone, not over 25 years of age,	66·4	33·6
2.	occipital bone, child of 8 years	- 66·6	33·4
3.	cervical vertebra, man of 40 years,	- 64·6	35·4
4.	of other subject,	- 61·1	38·9
5.	lumbar vertebra,	- 70·1	29·4
6.	female of 34,	- 71·4	28·6
7.	digital bone,	- 65·0	35·0
8.	shaft of thigh-bone, (adult,)	- 67·8	32·2
9.	scapula, coracoid process, aged 40,	- 60·3	39·7

* Lectures by Dr Grant in *Lancet* for 1834, p. 538.

+ *Ibid.* p. 618.

† *Lancet*, 1834, p. 762

§ *Ibid.* p. 841.

|| For by far the greater proportion of the bones whose analysis is given in the following table, I am indebted to the kindness of Mrs Carfrae, Bird-stuffer, Princes Street, Edinburgh. The best way to prepare bones for analysis is to cut them in thin slices, and then subject them to a thorough putrid fermentation or maceration. After this a stream of cold pure water ought to be poured over them till they are thoroughly deprived of all adventitious structures, when they are to be dried till they cease to lose weight, and then be carefully burned in covered capsules.

MAN.		Earth.	Cartilage
10.	Human adult's (above 40) radius, spongy extr.,	66.0	34.0
11.	adult. radius, solid shaft, -	66.6	33.4
12.	youth's radius, spongy extremity, -	66.0	34.0
13.	solid shaft, -	66.5	33.5
14.	child's (under 6,) radius, spongy extre-		
	mity, -	66.9	33.1
15.	child's radius, solid shaft, -	66.6	33.4
16.	adult's ulna, spongy extremity, -	66.0	34.0
17.	solid shaft, -	67.5	32.5
18.	youth's ulna, spongy extremity, -	66.6	33.4
19.	solid shaft, -	66.6	33.4

Human bones, average of 19 experiments,	66.61	33.39
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DOMESTIC ANIMALS.

20.	Ox, canon bone, solid shaft, - -	65.5	34.5
21.	spongy extremity, - -	65.3	34.7
22.	pelvic bone, (Teeswater breed, fed on brewer's grains,) -	63.9	36.1
23.	canon bone, extremity and shaft of do.	62.0	38.0
24.	epiphysis alone, -	62.9	37.1
25.	tibia, longitudinal section of whole bone,	63.3	36.7
26.	solid shaft, -	63.2	36.8
27.	articular extremity and half of shaft, (Galloway breed, fed on turnips and rape,) -	64.2	35.8
28.	dorsal vertebra, spinous process of do. -	64.7	35.3
29.	body of ditto, -	65.3	34.7
30.	rib, 3 years old, two several ribs each,	64.0	36.0
31.	pelvis, 4 years old, (Highland breed from pastures,) - - -	65.4	34.6
32.	sacrum of ditto, - - -	64.7	34.3
33.	sacrum of other Highlander, direct from pasture, - - -	66.6	33.4
34.	lumbar vertebra, spinous process of ditto,	65.8	34.2
35.	Cow, 15 years old, Ayrshire breed, direct from pastures, - - -	65.6	34.4

Bones of ox, average of 16 experiments,	64.51	35.49
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36.	Pig, jaw, 7½ months old, - -	64.3	35.7
37.	vomer, - - -	64.0	36.0
38.	skull, 7 months old, - - -	63.8	35.2
39.	8 months old, - - -	64.1	35.9
40.	sucking pig, - - -	65.7	34.3
41.	9 months old, - - -	66.6	33.4
42.	ethmoid bone, - - -	64.5	35.5

Bones of pig, average of 7 experiments,	64.71	35.29
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43.	Sheep, pastern bone, - -	64.1	35.9
44.	canon bone, solid shaft, - -	67.5	32.5
45.	tibia, - -	64.0	36.0
46.	pelvic bone, (2 several bones, each,) -	64.0	36.0
47.	canon bone, solid shaft, -	66.6	33.4
48.	tibia, whole bone (same as last,) -	66.6	33.4
49.	canon bone of other sheep, - -	65.9	34.1
50.	Lamb, jaw-bone, - -	64.2	35.8

DOMESTIC ANIMALS.				Earth.	Cartilage.
51. Sheep, solid shaft, radius,	}	-	-	65·8	34·2
52. solid shaft, canon of do.		-	-	65·7	34·3
53. Lamb, solid shaft, radius,		-	-	65·9	34·1
54. solid shaft, canon of do.	}		-	65·8	34·2

Bones of sheep, average of 12 experiments, 65·50 34·50

55. Horse, canon bone,	-	-	-	66·0	34·0
56. canon bone of other horse,	-	-	-	64·5	35·5
57. canon bone of other horse, (racer,)	-	-	-	69·6	30·4
58. accessory of canon bone, other horse,	-	-	-	66·6	33·4

Bones of horse, average of 4 experiments, 66·67 33·33

59. Dog, cervical vertebræ, old bull dog,	-	-	-	64·5	35·5
60. dorsal vertebræ, terrier,	-	-	-	65·8	34·2
61. tibia of terrier,	-	-	-	65·8	34·2
62. tibia of spaniel,	-	-	-	66·0	34·0
63. Newfoundland sucking puppy, whole bones,	-	-	-	66·6	33·4

Bones of dog, average of 5 experiments, 65·74 34·26

64. Cat, skull, whole bones, (domestic,)	-	-	-	66·4	33·6
65. skull, (wild cat,)	-	-	-	68·1	31·9
66. bones of leg, (wild cat,)	-	-	-	66·9	33·1
67. bones of leg, (domestic cat,)	-	-	-	66·1	33·9
68. vertebræ, (wild cat,)	-	-	-	66·0	33·0

Bones of cat, average of 5 experiments, 66·70 33·30

WILD MAMMALIA.

69. Rabbit, vertebræ,	-	-	-	64·9	35·1
70. pelvic bones	-	-	-	65·3	34·7
71. bones of leg,	-	-	-	65·1	34·9

Bones of rabbit, average of 3 experiments, 65·10 34·90

72. Hare, from Lanarkshire, radius,	-	-	-	66·3	33·7
73. do. ulna,	-	-	-	66·2	33·8
74. do. metacarpal bones,	-	-	-	66·2	33·8
75. do. tibia,	-	-	-	66·4	33·6
76. from north of England, tibia,	-	-	-	69·6	30·4
77. do. solid shafts of radius and ulna	-	-	-	69·5	30·5
78. native county unknown, scapula,	-	-	-	64·9	35·1
79. vertebræ of do.	-	-	-	65·0	35·0

Bones of hare, average of 8 experiments, 66·76 33·24

80. Red deer, skull, cervical vertebræ and canon bone, each and all,	-	-	-	66·3	33·7
81. Fox, from Perthshire, leg bones,	-	-	-	69·0	31·0
82. do. vertebræ,	-	-	-	65·5	34·5
83. from Lanarkshire, thigh bones, (shafts,)	-	-	-	70·0	30·0
84. do. tibia, radius and ulna, (shafts,)	-	-	-	69·6	30·4

* From the same pasture.

WILD MAMMALIA.						Earth.	Cartilage.
85.	Fox, vertebræ,	-	-	-	-	66·5	33·5
86.	from Berwickshire, thigh bones,	-	-	-	-	66·6	33·4
Bones of fox, average of 6 experiments,						67·86	32·14
87.	Bear, tibia,	-	-	-	-	62·0	38 0
88.	tarsus,	-	-	-	-	61·2	38·8
89.	digital bones,	-	-	-	-	62·5	37·5
Bones of bear, average of 3 experiments,						61·90	38·10
90.	Hedgehog, skull and jaws,	-	-	-	-	70·5	29 5
91.	thigh bones,	-	-	-	-	66·9	33·1
92.	vertebræ,	-	-	-	-	65·5	34·5
Bones of hedgehog, average of 3 experiments,						67·63	32·37
93.	Negro monkey,	-	-	-	-	68·0	32·0
94.	Marmosette monkey, whole bones,	-	-	-	-	62·3	37·7
95.	Squirrel, whole bones,	-	-	-	-	65 8	34·2
96.	Polecat, vertebræ,	-	-	-	-	65·8	34·2
97.	pelvic bones,	-	-	-	-	65·0	35·0
98.	ribs,	-	-	-	-	65·3	34·7
99.	shafts of thigh and leg bones,	-	-	-	-	65 1	34·9
Bones of polecat, average of 4 experiments,						65·30	34·70
100.	Seal, radius,	-	-	-	-	73·1	26·9
101.	Porpoise, vertebræ,	-	-	-	-	67·2	32·8
102.	scapula,	-	-	-	-	66·6	33·4
103.	Dolphin, skull,	-	-	-	-	66·6	33·4
104.	Greenland whale, jaw,	-	-	-	-	67·0	33·0
Bones of amphibious and cetaceous mammalia, average of 5 experiments,						68 10	31·90
BIRDS.							
a. BIRDS OF PREY.							
105.	Golden eagle (<i>Falco fulvus</i> or <i>chrysaëtos</i>) (from menagerie), thigh bone,	-	-	-	-	63·5	36·5
106.	sternum and clavicles	-	-	-	-	63·7	36·3
107.	pelvis,	-	-	-	-	63·6	36·4
108.	another specimen (from Argyleshire), thigh bone,	-	-	-	-	66·6	33·4
109.	Royal eagle (<i>F. imperialis</i>), clavicle,	-	-	-	-	66·2	33·8
110.	vertebræ,	-	-	-	-	65·9	34·1
111.	ribs,	-	-	-	-	66·0	34·0
112.	thigh bone,	-	-	-	-	66·3	33·7
113.	Sea eagle (<i>F. albicilla</i>) (from Harris), thigh bone,	-	-	-	-	65·9	34·1
114.	sternum,	-	-	-	-	66·0	34·0
115.	collar bone,	-	-	-	-	66·0	34·0
116.	Osprey (<i>F. haliaëtus</i>), pelvis,	-	-	-	-	66·3	33·7
117.	collar bone,	-	-	-	-	65·8	34·2
118.	thigh bone,	-	-	-	-	66·4	33·6
119.	Peregrine falcon (<i>F. peregrinus</i>), pelvis,	-	-	-	-	66·0	34·0
120.	thigh bone,	-	-	-	-	66·6	33·4

a. BIRDS OF PREY.

	a. BIRDS OF PREY.	Earth.	Cartilage.
121.	Rough-legged buzzard, (<i>F. lagopus</i>), thigh bone,	66·9	33·1
122.	pelvis, -	66·5	33·5
123.	vertebræ, -	66·6	33·4
124.	Honey buzzard, (<i>F. apivorus</i>), pelvis, -	65·9	34·1
125.	thigh bone, -	66·0	34·0
126.	wing bones, -	66·0	34·0
127.	Merlin (<i>F. Aesalon</i>), whole bones, -	66·6	33·2
128.	Hen-harrier, (<i>F. cyaneus</i>), pelvis and sternum,	66·7	33·4
129.	thigh and wing bones, -	67·0	33·0
130.	Kite, (<i>F. milvus</i>), pelvis, -	66·1	33·9
131.	thigh bone, -	66·0	34·0
132.	collar bone, -	66·0	34·0
133.	sternum, -	66·6	33·4
134.	Kestrel, (<i>F. tinnunculus</i>), thigh bones,	66·5	33·5
135.	wing bones, -	66·7	33·3
136.	Sparrow-hawk, (<i>F. nisus</i>), thigh and leg bones,	66·6	33·4
137.	wing bones, sternum, and vertebræ, each -	66·5	33·5
138.	Snowy owl, (<i>Strix nyctea</i>), pelvis, -	65·0	35·0
139.	Long-eared owl, (<i>Strix otus</i>) pelvis and sternum each	65·9	34·1
140.	Short-eared owl, (<i>S. brachyotus</i>), whole bones,	66·0	34·0
141.	Barred owl, (<i>S. nebulosa</i>), pelvis, -	66·0	34·0
142.	collar bone, vertebræ and sternum, each	66·1	33·9
143.	Common owl, (<i>S. stridula</i>), wing bones, -	66·1	33·9
144.	leg bones, -	66·0	34·0
145.	vertebræ and sternum, each -	66·1	33·9
146.	Barn owl, (<i>S. flammea</i>), wing bones, -	65·9	34·1
147.	leg bones, -	65·7	34·3
148.	leg bones, another specimen, -	66·0	34·0
149.	sternum and ribs, -	66·1	33·9

Bones of birds of prey, average of 45 experiments,	65.56	34.44
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b. WATER FOWL.

150.	Eider duck, (<i>Anas mollissima</i>), femur,	-	-	68·3	31·7
151.	wing bones,	-	-	68·3	31·7
152.	ribs and collar bones,	-	-	68·0	32·0
153.	sternum,	-	-	68·0	32·0
154.	Wild swan, (<i>Anas cygnus</i>), femur,	-	-	66·7	33·3
155.	sternum,	-	-	66·6	33·4
156.	Wild goose, (<i>A. anser</i>), femur,	-	-	66·9	33·1
157.	sternum,	-	-	66·8	33·2
158.	wing bones,	-	-	66·9	33·1
159.	Tame duck, femur,	-	-	66·3	33·7
160.	wing bones,	-	-	66·3	33·7
161.	<i>Larus Rissa</i> , sternum,	-	-	66·6	33·4
162.	collar bones,	-	-	68·3	31·7
163.	wing bones,	-	-	67·9	32·1
164.	Sea mew, (<i>Larus canus</i>), femur,	-	-	66·7	33·3
165.	wing bones,	-	-	66·6	33·4
166.	vertebræ,	-	-	67·0	33·0
167.	<i>Uria troile</i> , sternum,	-	-	64·8	35·2
168.	collar bones and ribs,	-	-	65·0	35·0
169.	<i>Alca torda</i> , sternum,	-	-	66·8	33·2

Bones of water fowl, average of 20 experiments,	66.94	33.06
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c. OTHER BIRDS.				Earth.	Cartilage.
170.	Domestic fowl, thigh bones,	-	-	66·8	33·2
171.	leg bones,	-	-	66·8	33·2
172.	wing bones,	-	-	66·8	33·2
173.	Turkey, thigh bones,	-	-	67·0	33·0
174.	wing bones,	-	-	66·8	33·2
175.	Silver pheasant, thigh bones,	-	-	66·6	33·4
176.	vertebræ,	-	-	65·9	34·1
177.	ribs,	-	-	66·0	34·0
178.	wing bones,	-	-	66·6	33·4
179.	Common heron, (<i>Ardea cinerea</i>), thigh bone,	-	-	65·7	34·3
180.	wing bones,	-	-	66·7	34·3
181.	vertebræ,	-	-	66·7	34·3
182.	ribs and sternum,	-	-	65·6	34·4
183.	another specimen, vertebræ,	-	-	66·4	33·6
184.	Do. thigh and leg bone,	-	-	66·3	33·7
185.	Do. wing bones,	-	-	66·3	33·7
186.	another specimen, pelvis,	-	-	66·6	33·4
187.	Do. vertebræ,	-	-	67·0	33·0
188.	Curassow, (<i>Crax globicera</i>), wing bones,	-	-	65·0	35·0
189.	leg bones,	-	-	65·0	35·0
190.	sternum and ribs,	-	-	65·0	35·0
191.	Columba magnifica, pelvis and sternum, each,	-	-	65·9	34·1
192.	Jay, (<i>Corvus glandarius</i>), whole bones,	-	-	66·0	34·0
193.	Starling, (<i>Sturnus vulgaris</i>), whole bones,	-	-	66·1	33·9
194.	Grey parrot, (<i>Psittacus erythacus</i>), vertebræ,	-	-	65·6	34·4
195.	ribs and collar bones,	-	-	66·0	34·0
196.	wing bones,	-	-	66·0	34·0
197.	Scarlet macaw, (<i>P. macao</i>), vertebræ,	-	-	65·7	34·3
198.	ribs and collar bones,	-	-	65·6	34·4

Bones of other birds, average of 29 experiments, 66·08 33·92

REPTILES.

199.	Turtle, jaw bone,	-	-	66·6	33·4
200.	skull,	-	-	66·6	33·4
201.	Python Javanicus, ribs,	-	-	65·0	35·0
202.	vertebræ,	-	-	66·1	33·9
203.	Boa, (species unknown), vertebræ,	-	-	67·0	33·0
204.	Viper, ribs,	-	-	66·8	33·3
205.	vertebræ,	-	-	66·7	33·4
206.	another specimen, vertebræ,	-	-	66·1	33·9
207.	Ringed snake, (<i>Coluber natrix</i>), vertebræ,	-	-	66·5	33·5

Reptiles' bones, average of 9 experiments, 66·41 33·59

FISHES.

a. OSSEROUS FISHES.

208.	Turbot, vertebræ,	-	-	66·5	33·5
209.	Haddock, vertebræ,	-	-	68·0	32·0
210.	another fish,	-	-	68·3	31·7
211.	another fish,	-	-	68·5	31·5
212.	Cod, vertebræ,	-	-	66·9	33·1
213.	another fish,	-	-	67·0	33·0
214.	another fish,	-	-	66·8	33·2
215.	Tusk, vertebræ,	-	-	66·7	33·3

a. OSSEOUS FISHES.				Earth.	Cartilage.
216.	Tusk, vertebræ, another fish,	-	-	66·6	35·4
217.	Ling, vertebræ,	-	-	67·0	33·0
218.	another fish,	-	-	66·8	33·2
219.	Whiting, vertebræ,	-	-	66·9	33·1
220.	Salmon, vertebræ,	-	-	66·5	33·5

Bones of osseous fishes, average of 13 experiments, 67·11 32·89

b. CARTILAGINOUS FISHES.				Earth.	Cartilage.
221.	Sturgeon, (<i>Accipenser sturio</i>), true bones around the mouth,	-	-	66·8	35·2
222.	Basking shark, (<i>Squalus maximus</i>), osseous portion of vertebræ,	-	-	71·5	28·5
223.	Gray skate, (<i>Raja batis</i>), osseous portion of vertebræ,	-	-	69·1	30·9
224.	common cartilaginous skeleton,	-	-	35·0	65·0
225.	vertebræ with their cartilaginous incrustation, varied according to the part of body from which they were taken from	-	-	41·5 to 53·3	58·5 to 46·7
226.	Thornback ray, (<i>R. clavata</i>), osseous portion of vertebræ,	-	-	69·1	30·9
227.	common cartilaginous skeleton,	-	-	35·0	65·0
228.	vertebræ, with cartilaginous incrustation, according to part of body from which they were taken, varied from	-	-	42·1 to 54·2	57·9 to 45·8
229.	Starry ray, (<i>R. Radiata</i>), osseous portion of vertebræ,	-	-	68·8	31·2
230.	Flapper skate, (<i>R. intermedia</i>), osseous portions of vertebræ,	-	-	67·0	33·0
231.	cartilaginous skeleton of do.	-	-	34·3	65·7
232.	Dog fish, (<i>Scyllium catulus</i>), osseous portion of vertebræ,	-	-	68·9	31·1
Osseous portions of skeleton of cartilaginous fishes, } average of 7 experiments,				68·74	31·26

From the above extensive series of experiments, amounting in number to 232, it is apparent that the average amount of earthy and of animal matters in the cleaned bones of the different animals will stand thus :

Table exhibiting the average results arrived at in the bones of the different classes of animals.

100 parts of dry clean bone.				Earth.	Cartilage.
Man,	-	mean of 19 experiments,	-	66·61	33·39
Ox,	-	16 Do.	-	64·51	35·49
Pig,	-	7 Do.	-	64·71	35·29
Sheep,	-	12 Do.	-	65·50	34·50
Horse,	-	4 Do.	-	66·67	33·33
Dog,	-	5 Do.	-	65·74	34·26
Cat,	-	5 Do.	-	66·70	33·30
Rabbit,	-	3 Do.	-	65·10	34·90
Hare,	-	8 Do.	-	66·76	33·24
Red deer,	-	3 Do.	-	66·30	33·70

				Earth.	Cartilage
Fox,	-	mean of 6 experiments,	-	67.86	32.14
Bear,	-	3	Do.	61.90	38.10
Hedgehog,	-	3	Do.	67.63	32.37
Negro monkey,	-	1	Do.	68.00	32.00
Marmozette monkey,	-	1	Do.	62.30	37.70
Squirrel,	-	1	Do.	65.80	34.20
Polecat,	-	4	Do.	65.30	34.70
Amphibia and cetacea,	-	5	Do.	68.10	31.90
Birds of prey,	-	45	Do.	65.66	34.34
Water-fowl,	-	20	Do.	66.94	33.06
Other birds,	-	29	Do.	66.08	33.92
Reptiles,	-	9	Do.	66.41	33.59
Osseous fishes,	-	13	Do.	67.11	32.89
Cartilaginous fishes,	-	7	Do.	68.74	31.26
Mean proportion in bones of whole of vertebrated animals,				66.09	33.91

From these experiments we see how very nearly the same is the proportion of earthy and of animal matters in the bones over the whole animal kingdom. They seem to demonstrate that wherever a true bone occurs, that bone contains the same average amount of earthy and of animal matters. We see that there is no difference in this respect between the true bones which surround the mouth of the sturgeon, and the bones of birds or of the mammalia. Yet the sturgeon is one of those fishes so low in the scale of creation, that its skeleton consists of simple cartilage. These experiments, therefore, demonstrate the fallacy of the statement, that the bones contain a larger amount of earthy matter the higher we ascend in the scale of organization.

But they allow other and important conclusions to be drawn.

Firstly, The animalized base composes very nearly an exact third of the weight of the dry clean bone.

Secondly, The proportion of earthy matters in the bones of the wild mammalia seems to be a fraction higher than in the domesticated animals. Thus, while the bones of the ox yielded on an average only 64.51, those of the pig, 64.71, those of the sheep, 65.50, and those of the dog, 65.74 per cent. of earthy matters; those of the hare yielded 66.76, those of the fox, 67.86, those of the hedgehog, 67.63, and those of the amphibia and cetacea, 68.10 per cent. of earthy matters.

Thirdly, The bones of animals artificially fed, and of those which die of disease, vary most in the relative proportions of earthy and of animal matters. In illustration of this, I would simply refer to the experiments on the bones of man and of the ox. In man we see that the per centage of earthy matter varied from 60.3 to 71.4,—a difference which I am inclined to attribute more to the disease of which the person died than to simple dif-

ference in food. We know, besides, that according to the disease under which the person is labouring is the amount and nature of the excretions; and while in many the excretion of phosphates is increased, in others it is the excretion of animalized matters. This cannot, therefore, fail to affect the composition of the tissues of the whole body, and seems satisfactorily to account for the varying proportions of earthy matter in the human bones,—proportions which vary more than in those of any other animal.

Being curious to ascertain how far food or habits influenced the healthy nutrition of bones, I with some little trouble procured a few bones of oxen fed in different ways. Thus Nos. 22 and 23 were from a Teeswater ox fattened on brewers' grains, and the highest per centage of earthy matter which its bones presented was 63.9. Nos. 27, 28, and 29 were from a Galloway ox fattened on turnips and rape, and the per centage of earthy matter varied from 64.2 to 65.3. Nos. 31, 32, 33, and 34 were from Highland oxen direct from the pastures, and in them the per centage varied from 65.4 to 66.6; and, lastly, No. 35 was from an Ayrshire cow also direct from the pastures, and the per centage of earthy matter was the same as one of the Highland oxen, viz. 65.6.

The varying proportions of earthy matter in the bones of these animals I feel inclined to attribute more to difference of habit than to mere difference of breed or of food. The Teeswater and Galloway oxen had been shut up for a long time, and had been without exercise during all the period of their fattening. This, therefore, may have been the reason why their bones presented a smaller amount of earthy salts than in the Highland oxen or Ayrshire cow, which were more naturally fed, and were allowed exercise in the open air.

As to sheep, the only point on which I could procure any information was, that the bones of those from the same pasture yielded exactly the same proportions of earthy and of animal matters, as is apparent from comparing the results of Nos. 51, 52, 53, and 54.

Thirdly, Age does not seem to increase the amount of earthy matters in the bones of animals. This is contrary to the received notion that "the bones of the aged contain more earthy matter than the soft pliant bones of the young." The above tables exhibit this fact in many places. Thus, under the human bones, Nos. 10 to 15 inclusive exhibit a comparative analysis of the bones of the adult, youth, and child, and we find that the proportions are so precisely similar that we may not presume to say they exceed in any one case. Indeed, the solid shaft of the radius of the child under six years of age, and that of the adults above 40, contained the exact same amount of earthy ingredients, even to a fraction.

For the purpose of seeing whether the lower animals were subject to the same law, I, with great difficulty, procured the bones of a very aged Ayrshire cow, No. 35, whose exact age I ascertained from the farmer who bred it and kept it till it was sent to the butcher. In this animal the per centage of earthy matter was at the maximum, but not larger than was noticed in Nos. 20, 32, and 34, and was even one per cent. lower than what was observed in No. 33. Yet these latter animals were not beyond four years old.

The sheep exhibited the same fact. Nos. 51, 52, 53, and 54, were sheep and lambs from the same pasture. The proportion of earthy and of animal matters in the bones of each were identical. These examples may suffice to show that the perfectly ossified bone of the young animal contains as great an amount of earthy matter as those of the adult.*

Fourthly, The hardness of bone does not depend on the amount of earthy matter contained in it. This is rendered very apparent by the consideration that the bones of fishes, which are all easily cut, and present to the knife a kind of toughness rather than hardness, contain to the full as large an amount of earthy matters as the ivory-like leg-bones of the deer or sheep. If, from the bones of a whole class, we descend to the particular bones of the same animal's body, the same fact will be abundantly manifested. The sacrum, pelvis, vertebræ, and ribs are, generally speaking, the softest in the animal's body; yet, if we refer to these bones in the above experiments, we shall find that their average proportion of earthy matter is as great as that of the most solid shafts of the cylindrical bones of the extremities. In the ox, indeed, Nos. 31, 32, 33, 34, show that the vertebral, sacral, and pelvic bones yielded a fully greater proportion of earthy matter than even the solid leg bones of the same animal. The same was observed with the human lumbar vertebræ in Nos. 5 and 6; and in the red deer the spongy cervical vertebræ and the ivory-like leg bones yielded the very same amount of earthy matters. The hardness of a bone, then, does not depend on the increased proportion of earthy matter in its substance; nor does a spongy bone differ in chemical constitution from a solid bone. The difference in hardness and sponginess depends on its physical structure.

Fifthly, Earthy matters are, generally speaking, much less flexible than vegetable or animal substances. It might therefore be

* In analyzing the bones of young animals especial care must be taken not to include the layer of soft cartilage which exists between the epiphysis and shaft of the bone. If this be included, it invariably shows the young bone to contain a larger proportion of animal matter. I am therefore inclined to believe that this point has not been attended to in analyzing fœtal bones, and that hence the prevalent notion has arisen, that the bones of the young contain a smaller proportion of earthy matter than those of the old.

expected that the most flexible bones would also be those which contained least earthy solids in their composition. Such, however, is not the case. The bones of fishes, which, as a general rule, seem to contain the largest proportion of earthy matters, are also those which are pre-eminent for their flexibility; and it is a well-known fact, that in that disease called *mollities ossium*, in which the bones are quite soft from the excessive deficiency of earthy matters, the bones are more frangible than at any other time, and the slightest injury causes them to break across. Increased flexibility of a bone, then, does not depend on a diminished proportion of earthy solids in its texture; but, like that of increased hardness, on the peculiar structural arrangement of the tissue.

Sixthly, The transparency of bones does not depend on a deficiency of earthy matter. The bones of fishes, though containing the full average proportion of earthy salts, are yet semitransparent; while those of birds, reptiles, and mammalia, though not containing a fraction more, are opaque. This transparency of fish-bones seems principally to depend on their minute cellular structure being filled with a saline fluid or albumino-gelatinous matter, instead of the oily matter which fills the same structures in the bones of mammalia, birds, and reptiles. The bones of the mouth of the sturgeon, which contain fatty matter, are as opaque as those of the mammalia, as are the vertebræ of many species of fish which contain fatty matter.

These varied experiments, then, seem to prove that the amount of earthy matters in healthy bones is nearly uniform over the whole animal kingdom; and that neither the solidity nor sponginess, the rigidity or flexibility, the opacity or transparency of bones depends on an increased or diminished amount of earthy matters in their composition. The trifling differences noticed in the relative amount of earthy and animal matters in some of the experiments does not detract from the general conclusion, that the proportion is nearly uniform. Much probably depends on the nature of the food, and the state of health of the animal at the time when it died or was killed. We know, besides, that many diseases cause the excretion of large quantities of phosphatic earths, while others are characterized by large wastes of animalized matters. Both of these must act more or less on the existing tissues. We must therefore rest satisfied with general results, without attending too much to particular exceptions, regarding which we cannot get any very positive information.

Before concluding this part of the paper, a short notice may be taken of the results at which other experimentalists have arrived, as to the proportions of earthy and animal matters in the bones.

Fourcroy and Vauquelin, Davy, Berzelius, Denis, D'Arcet, and more recently Dr Rees, Marchand, Frerichs, and Dr Thom-

son of Glasgow have published analyses of bones, (chiefly human,) but their results are far from agreeing. Their general fault is, that they rate the amount of animal matter too high, and this probably arose from two causes: *firstly*, they did not clean the bone sufficiently from fat or oil previous to burning it; and *secondly*, they did not sufficiently free it from the moisture, which it most obstinately retains. The writer's own account of the mode in which they operated satisfactorily prove the above to have been the case; and it is this which destroys the value of Dr Rees, M. Denis, and Dr Thomson's experiments, and is the probable cause of their differing so widely from those of Berzelius, D'Arcet, Marchand, Frerichs, and my own.

Berzelius in his experiments with human bones got 66·70 per cent. of earthy, and 33·30 of animal matters; and Marchand got in the same bones 66·75 earthy, and 32·25 animal matters. But the fault of these two chemists was in supposing all bones to be of uniform composition. Hence when Frerichs attempted to authenticate their results, he found that the proportion of earthy matters varied from 60·5 to 70·2 per cent. in human bones apparently healthy,—a result which closely corresponds with those above detailed.

Few chemists, however, have analyzed the bones of the lower animals. Indeed, with the exception of a very few meagre observations on this subject, scattered through the works of Fourcroy and Vauquelin, Berzelius, D'Arcet, and Dr Thomson, I know of no place where any information could be procured on this point. It is to be hoped that the above experiments will, in some measure, supply that deficiency, and prove the more valuable, as from being collected in one table, and being all made in the very same way, the results in the different classes of animals may be compared together.

There is one subject, however, which it would be wrong to pass over without notice, as being one to which my attention has been repeatedly and forcibly directed during the course of these experiments, and that is the excessive fragility of human bones as compared with that of the bones of any other animal. I know of the bones of no animal which are so easily destroyed, or which possess so little power of resisting external agencies. In preparing human bones for chemical examination it was found that the osseous matter was so slightly held together, that, when deprived of the contained membranes and fat, they gave way on no great pressure. This was most especially remarked of the spongy bones, as the vertebræ, sacrum, &c., as well as of the spongy extremities of the long bones; and no one on comparing prepared specimens of these bones, with corresponding ones of the lower animals, but must come to the same conclusion. The bones of

the lower animals similarly prepared will bear the roughest handling without injury ; whereas those of man, when thoroughly cleaned of all their fatty matters, I have again and again crushed by firm pressure between the finger and thumb. This circumstance would perhaps tend to account for the fact of the bones of man never being met with in those tertiary deposits in which those of the lower animals are so abundant.

21 Heriot Row, January 1845.

ART. V.—*A peculiar Case of Nervous Disease or derangement of the Nervous System.* By GEORGE CALVERT HOLLAND, M. D., Physician Extraordinary to the Sheffield General Infirmary. [Read before the Medical Society of Sheffield, 1843.]

THE particulars of the following case are not adduced in support of any speculation or opinion with which we shall trespass on the indulgence of the society. We regard it as exceedingly valuable, in relation to views explanatory of the phenomena of the nervous system, though we do not on this occasion feel at liberty to state, in precise terms, the light in which the value consists.

September 23d 1842, Harriet Blackburn, aged 20, came under our care at the Sheffield Infirmary. The case was one of paralysis. She had lost the use of her lower extremities, and, to some extent, of the arms. Both, but especially the former, were also quite insensible to any superficial puncture of the skin. She felt, and then only slightly, when a needle was introduced somewhat deeply into the flesh. The following account she gave throwing light on the history of the case. Three weeks before her admission she was seized with numbness in the arms and legs, and which gradually increased until she lost the use of the latter. The catamenia were regular. A medical gentleman was then requested to see her, and, viewing the case as demanding active treatment, he immediately prescribed twenty leeches to the lumbar region. Of the internal remedies employed we have no account.

This was the statement she made explaining the origin of the disease. She had no pain whatever when she came under our care, nor had she had any during the progress of the malady.

Her general health was good previously to the attack ; nor could we discover, beyond the loss of motion and sensibility, any constitutional derangement. There was no tenderness in any part of the spine, no confusion of head, nor any unnatural ex-

pression of the countenance. The bowels, as far as we could learn, had been regularly acted upon. The patient to appearance was particularly healthy and good looking, and was rather stout.

We candidly confess we felt considerable difficulty in getting hold of any prominent symptom to suggest and direct the treatment. We thought the measures which had already been employed were judicious and ought to be enforced. We had no doubt that the internal treatment had been equally active with the external. The case, judging from the symptoms and the character of the constitution, clearly required both. We have already stated that, in a short time previously to the patient's coming under our care, twenty leeches had been applied to the lumbar region. We ordered free venesection from the arm, a blister to the nape of the neck, and two grains of calomel twice a day, and the warm bath every night; and this treatment was continued from September 24th to October 4th without any obvious improvement in the symptoms. The bowels during this time had been acted upon once or twice a day. At the latter date the tartar-emetic ointment was ordered to be rubbed along the spine night and morning,—one grain of calomel and two of Dover's powder to be taken every night at bed-time, and a purgative draught every morning. The bath to be discontinued.

On the 9th of October there was some slight improvement in the return of sensibility, but none in the use of the limbs, which determined us to act more freely on the bowels and by means of stimulating purgatives. At this time six drachms of the *Oleum Terebinthinæ* and two of castor-oil were prescribed with peppermint water. The day, or day but one after, the patient voided *per anum* the common round worm, the *Ascaris lumbricoides*, after which the motion and sensibility of the limbs almost immediately returned. In the course of two or three days the previous symptoms were entirely removed. Purgatives were subsequently prescribed, but no worms were expelled. The patient afterwards suffered from pain in the abdomen, for which six leeches and a blister were prescribed and other remedies employed. She was discharged cured on the 20th of October.

Every medical practitioner is familiar with the extensive and irregular derangement of the nervous system occasionally occurring in children; but we believe the foregoing case exhibits phenomena which do not, from such a cause, often fall under observation. The experience of twenty years, and two-thirds of it in connection with public institutions, has certainly not presented to our notice any other case of the same kind;—a case in which we could not discover a single symptom to lead us to imagine that irritation in the bowels was the cause of the distressing effects.

ART. VI.—*Remarks on Tertian Intermittent Fever.* By
THOMAS STRATTON, M. D. Edin.; Navy Medical Department;
Honorary Member of Highland Society of Canada, &c.

THE following sketch of tertian ague, as observed at Grand River, Lake Erie, in 1842, may serve in some degree for comparing this disease with its appearance in other parts of Canada,* in other countries, and in other years in the same part of the country. In keeping cases of intermittent fever, a convenient and accurate way is to have tables for the paroxysms, as given below, by looking at which one may see at a glance when the next fit may be expected, and exhibit the preventive accordingly; an objection to them may be that they have a show of minute accuracy greater than the reality, but it is not pretended that the attacks always commenced at the exact time mentioned, in two-thirds of the instances the duration of the stages being fifteen or twenty minutes more or less.

CASE I.—Mrs P. aged 27, wife of private Pollard, royal marines, has been three months in this part of the province, living on the right bank of the river in a house within about twenty yards of an extensive marsh; she never had ague.

Sept. 5. For the last two days she has felt pain in the back and legs, and to-day she complains of pain in the head, back, and legs; pulse quick, skin hot, thirst, nausea, no vomiting, tongue foul, one stool. Hair to be thinned, cold affusion on the head, an ipecacuan emetic, and, two hours after its operation, to take calomel and colocynth.

Date.	Cold stage.		Hot stage.		Sweating stage,		Paroxysm.		
1842.	lasting		lasting		lasting		lasting		
Sept.	hrs		hrs		hrs		hrs		
6	from 3 P.M.	to 6	3	from 6 to 10	4	from 10 to 12	2	from 3 P.M.	to 12
8	3½	4½	1	4½	6	8	2	3½	8 4½

Sept. 6. After the vomiting the headach was greatly relieved; two stools; at 3 P. M. a severe fit of ague commenced.

Sept. 7. Was out of bed most of the day; bowels open. To have two scruples of compound jalap powder, and to take at four to-morrow morning, eleven hours before the next expected fit, eight grains of quinine in an ounce of water with eight minims of diluted sulphuric acid.

Sept. 8. The rigors began at 3½ P. M. This was of much less severity and of shorter duration than the former fit.

Sept. 9. To have opening medicine; and at 9 P. M., eighteen hours before the next expected accession, to take eight grains of quinine in solution.

Sept. 10. She escaped the paroxysm to-day; she is walking

* Edin. Med. and Surg. Journal for April 1841, p. 348; Oct. 1843, p. 367; and April 1844, p. 392.

about. There is a vesicular eruption on the lips; the complexion is slightly aguish.

Oct. 28. There has been no return of the complaint. She took in all sixteen grains of quinine, in two equal doses, one given eleven hours before the next expected fit, which it failed to prevent but rendered later, milder, and shorter. The second quantity was successfully given eighteen hours before the next expected accession.

It often happens that a first attack has two or three days of preliminary symptoms like the above, while succeeding ones are unexpectedly ushered in at once by the invasion of the cold stage, though sometimes, as in Macmahon's case, a first fit of ague has no premonitory symptoms.

CASE II. John Macmahon, aged 34, corporal first incorporated militia at the barracks on the left bank of the river, and about thirty yards from a marsh several miles in extent; he has been three years in the province and never had ague; after being a week at Port Maitland, he was seized with intermittent on the 21st of May, and had returns of the fit on the 23d, 25th, and 27th, he being at his duty on the well-days, (as the patients call them.)

May 29. He applied for the first time; some pain in the region of the spleen. To have calomel and colocynth. The fit returned at noon.

May 30. He is up and moving about; his bowels have been freely opened. At 10 A. M. he had eight grains of quinine in solution, and to have the same quantity repeated at four to-morrow morning.

May 31. At 1 P. M. rigors for half an hour, hot for two hours, and sweating for two hours and a half. The fit to-day was less severe than the former ones.

June 6. No return of the complaint; he had in all sixteen grains of quinine in two doses, the first given twenty-six hours and the other eight hours before the next fit, made it much shorter and milder than before, and there was no second paroxysm after the exhibition of the quinine. There is no lip-eruption; he has the ague complexion.

CASE III. Benjamin Davis, aged 30, private royal marines, has had ague before, and had a return of it on July 20.

July 20. Headach, pains in the back and legs, weakness.

July 21. Rigors began at noon.

Date.	First stage.	Second stage.	Third stage.	Paroxysm.
1842.	lasting	lasting	lasting	lasting
July.	hrs	hrs	hrs	hrs
21 from 12 A.M. to 1	1 from 1 to 3½	2½ from 3½ to 5	1½ 12 A.M. 5 P.M. 5	
23	1 P. M. 2 1	2 4 2	4 5 1 1 P.M. 5	4
25	2 3 1	3 4½ 1½	4½ 5½ 1 2	5½ 3

July 25. He applied for the first time ; bowels confined ; no lip eruption ; complexion slightly aguish. To have calomel and jalap at 2 p. m. The rigors returned at 8 p. m. ; three stools ; he now feels pretty well ; no complaint but of weakness. To have six grains of quinine in solution.

July 26. To have three grains of quinine.

August 3. There has been no return of the complaint. In this case the fits were mild, there being in the cold stages only chilliness, no shaking or even shivering. The case was cured by nine grains of quinine.

CASE IV. William Williams, aged 39, petty officer, H. M. steamer, Toronto, has been $4\frac{1}{2}$ years in Canada, of which $2\frac{1}{2}$ on Lake Erie ; never had ague before ; he had a fit of ague on the 13th, 15th, and 17th of September, always about 3 p. m. The cold stages being mild, the other two of ordinary duration.

Sept. 18. Bowels confined. To have calomel followed by sulphate of magnesia at 6 p. m. After several stools he took eight grains of quinine in solution twenty-one hours before the next expected fit.

Sept. 19. At 9 a. m. he had opening medicine, and also three grains of quinine six hours before the next expected fit. He was a little feverish last night ; he escaped the paroxysm to-day.

Sept. 24. There has been no return of the complaint. Before the disease was checked he took eleven grains of quinine and other thirteen afterwards in several doses as a tonic ; he has the ague complexion ; there is no lip eruption.

CASE V. William Austerberry, aged 42, seaman, royal navy, had dumb-ague in the summer of 1841.

June 12. At 10 a. m. rigors for an hour, feverish for four hours, and then sweating for two hours.

June 13. Bowels open ; anorexia ; weakness. To take calomel and compound jalap powder, and at four to-morrow morning, six hours before the next fit may be expected, seven grains of quinine.

June 14. At 10 a. m. no rigors as yet ; several stools. To have four grains of quinine. At 11 a. m. slight rigors for fifteen minutes, and then hot for a short time ; he almost escaped the paroxysm.

June 15. No complaint but of weakness.

June 16. At $6\frac{1}{2}$ a. m. a short and mild fit.

June 30. There was no return of the complaint ; after the shadow of a fit on the 14th, it was thought there would be no more paroxysms and he took no more quinine ; there was no lip eruption.

CASE VI. William Silverthorne, aged 21, seaman, royal navy, has been six years in the province; never had ague before.

August 14. At 11 A. M. rigors began, and the fit ended about 4 P. M.

Aug. 16. The fit commenced at 8 A. M.; at 6 P. M. he had calomel and colocynth.

Aug. 17. This is the well-day; no pain in the head or side; three stools; a little appetite; weakness. At 8 P. M., twelve hours before the usual accession, he took eight grains of quinine in solution.

Aug. 18. He escaped the fit to-day. To take five grains of blue pill daily for the next four days.

Aug. 19. To return to duty. There is no lip-eruption; the complexion is slightly aguish.

CASE VII. Joseph Mendez, aged 24, seaman, royal navy, is a Maltese. On Aug. 5th at 10 A. M. rigors commenced, and the paroxysm ended about 4 P. M. He had purgative medicine.

August 7. The fit began at 7 A. M. In the course of it he had opening medicine; the hair was cut short, and cold affusion on the head gave great relief to the pain therein.

Aug. 8. Several stools; no appetite; weak. At 8 P. M., eleven hours before the next expected fit, he took eight grains of quinine in solution.

Aug. 9. He escaped the fit to-day.

Aug. 12. There has been no more ague. On the night of the 9th he was a little feverish without any previous rigors. His complexion is so dark naturally that it is difficult for him to have the ague complexion. He had only one dose of quinine, and no medicine of any kind after the 8th. There is an eruption on the lips.

REMARKS.—Port Maitland, at the mouth of Grand River (or the Ouse) is in north latitude $42^{\circ} 32'$, and in west longitude $79^{\circ} 34'$. There are many miles of marsh on its left side and several on its right; and during the summer and autumn the thermometer was often 80° and 86° F. in the shade, and 100° and 120° F. in the sun.

Between quotidian and tertians the chief practical difference is that the latter are more easily cured, there being on the well-day time given for the exhibition and operation of purgatives previous to prescribing quinine, while in the former the intermission is sometimes inconveniently short for these purposes.

The terminations of tertian in a copious flow of urine and in sweating,* noticed in some countries, I have not observed here,

* Dr Craigie's Practice of Physic, 1837, vol. i. p. 48.

though the favourable sign of a vesicular eruption about the mouth is not unfrequent.

With respect to the use of emetics in intermittent fever, among the general febrile symptoms which sometimes prevail for a day or two before there are distinct fits of ague, the severe headach is at times relieved by natural vomiting, and in such instances nature seems to point to the employment of emetics to remove from the stomach a quantity of bile which appears to be connected with the cerebral pain. In the first case (Pollard) an emetic gave great relief. But after there are distinct paroxysms and violent headaches either in the cold or hot stage or both, emetics are for the most part useless or injurious.*

In giving quinine, the form of solution appears to me to be much preferable to that of administering it in pills, the former mode having the advantage of speedier action, a thing of so much consequence where not much time is given for anticipating an approaching paroxysm. It might be thought that the pill-form had an advantage in being less likely to excite vomiting; but as most persons require to take some liquid after them, it comes to the same thing; while, on the other hand, the acid given with the sulphate of quinine in solution may have some tendency to prevent vomiting. Of quinine eight grains are equal in strength to about ninety-six of cinchona, and such a bulk in one dose would, by most stomachs, be instantly rejected. In the fever-season of 1842 I made no use of cinchona, and never do so except when its chemical extract is scarce. In the medicine-chests used in the public service it would be well to discontinue sending cinchona, and as an improvement, to send a larger quantity of quinine. I have treated different cases at the same time, one set with quinine, another with cinchona, and a third with bark and a small quantity of rhubarb added. In the second set the first four or five doses (of half a-drachm or two scruples each) were usually vomited; but when rhubarb was added, after one or two doses had been rejected, the patient was able to retain the medicine, but in a quantity too small to have sufficient effect. When a practitioner is at the same time treating some patients with quinine and others with bark, the results of the latter method and the delayed recovery of the cases is particularly unsatisfactory.

Dr Mackintosh's plan of bleeding in the cold stage† I tried some years before, without observing any great benefit derived from it, so that of this method of treatment and of arsenic I this year made no use, the employment of quinine alone being found to be sufficiently satisfactory.

The seven cases mentioned in this paper took in all ninety-two

* In the severe forms of Mediterranean fever, emetics were found to be highly prejudicial. Sir William Burnett on the Mediterranean Fever, 2d. Edit., 1816, p. 33

† This method is not approved of by Dr Copland, (*Dict. of Medicine*, vol. i. p. 941,) Dr Stokes Mr Gill, and others.

grains of quinine, being at the rate of thirteen grains each. In two of the cases, after the disease was checked, sixteen grains were given when not absolutely necessary, and only as a general tonic, so that these seven tertians were checked by eleven grains each.

In the fever-season of 1842, of the seamen, marines, militia, and inhabitants, about one-third were attacked by malarial fevers, which were to each other in nearly the following proportions:—the tertians were to the quotidians as five to four; the tertians and quotidians together equalled the remittents; about one-tenth of the whole was composed of other malarial fevers. To state the proportions per cent. in 100 cases of malarial fever there were 45 remittents, 25 tertians, 20 quotidians, and 10 were composed of irregular ague, ague of one paroxysm, dumb ague, quartans, and of a disease which may perhaps be called malarial continued fever.

The above proportions do not apply to a body of men employed in cutting the "Junction Canal" from near the mouth of Grand River to the canal called the "Feeder." This work passed through a marshy and hitherto uncleared forest, where the dense malaria never was disturbed by wind. The labourers were often fighting with each other in large parties, one party endeavouring to drive the other away from the work. In this way they frequently threw themselves out of wages and into want, thus creating a predisposition to the attack of any disease. These men with their families amounted to above 1300 persons, and as the work was much impeded by the sickness, the Board of Works had a census taken several times to number those able to labour, and the sick, so as to account for the canal not being ready by the intended time. During most of the season there were constantly upwards of six hundred sick, of whom more than half were confined to bed. There were many deaths, most of which were from want of suitable nourishment during convalescence, and of proper shelter, their houses being only temporary huts of boards. Many were arriving during the summer, so that the number of the sick was kept up to the melancholy height above-mentioned. In the body of individuals which is kept separate from the other, as they were peculiarly exposed to malaria, and likewise were all new arrivals, the proportion of remittents was greater than in the former group; they were treated by a resident practitioner.

While malarial fever thus prevails on the British side of Lake Erie, we may suppose that on the United States side,* as it

* In the American Journal of the Medical Sciences for November 1830, Dr Parsons refers to places on the American side of the great lakes where marsh fevers prevail. In 1841 I made a tour through the United States, and received much civility from the medical men I happened to meet. At Boston I saw Mr Howe, who has under his care Laura Bridgman, the girl who has the triple infliction of being blind, deaf, and dumb, and who owes to his humane and skilful exertions a degree of intelligence not inferior to that of many who have all their senses, her sense of touch

is more to the south, there will, in marshy situations, be more fever.

I have thus endeavoured to give some account of one of the diseases of a part of this province, which may at some future time be found useful for comparing the state of health about Grand River in 1842 with what it may be, after changes taking place in further clearing of the land, in cultivation and draining.

Penetanguishene, Lake Huron,
September 1844.

ART. VII.—*Notice of an Epidemic of Scarlet Fever and Scarlet Sore Throat, which prevailed in 1843-4.* By THOMAS STRATTON, M. D., Edinburgh.

THE town or village of Penetanguishene is situated on the bay of the same name, a part of Georgian Bay, an arm of Lake Huron. It is 100 miles north from Toronto, where scarlet fever prevailed in the beginning of 1843, and thence extended through the country northwards, having a character of fatality greater than most scarlatinous epidemics, and not a few adults and elderly persons falling victims to it.

Its Duration.—In the town the epidemic lasted five months, from October 1843 to March 1844; in the neighbourhood (by which is meant within three miles of Penetanguishene), it continued for eight months, from September to May, the malady taking a longer time to spread among the scattered inhabitants of the country than in the denser population of the town. The first case occurred three miles to the north of the town, and was not followed by another for a month; in the end of October and beginning of November there was a group of cases chiefly among the French and half-breeds; in February and March the epidemic was at its height, attacking mostly children of British origin; in April there were few new cases; and one, the last, occurred in May.

Different Races.—As the population of the town is of a mixed character, being composed, in the order of their numbers, of French-Canadians, British, half-breeds, (which is their common local name, and who are of Indian and French, or of Indian and British parentage), and Chipawa-Indians,—and as the different races of mankind vary in, 1st, their liability to certain maladies,

being educated so as to make up in part for the want of the others. I had an opportunity also of seeing the celebrated Warren operate. At Philadelphia Dr Isaac Hays and Dr Horner shewed me several museums, Dr Selden at the Philadelphia Hospital, and Dr Hartshorn pointed out various medical curiosities, and from Dr W. P. Barton, Dr Coale, and Dr W. Grier of the United States public service, I met with the same frank and kind reception that I should expect from brother officers in Her Majesty's service.

and, 2d, the intensity of the disease in them when attacked,* I was desirous to notice if any difference could be observed here in the epidemic as it appeared among the Indians and half-breeds on the one hand, and the French and British on the other. I had no Indians† among my patients. As to the half-breeds there was a smaller proportionate number of them attacked than of the French and British. I was also inclined to think that the former presented rather less constitutional disturbance, considering the extent of the rash, than the latter, among whom were all the dropsical cases, and nearly all those in which the glands were considerably or tediously affected.

Its Mortality.—I treated sixty-two cases, among which there were four deaths, being 1 in 15½, or 6½ in 100. I saw various other cases in the practice of a friend, a practitioner in the neighbourhood, and I afterwards heard of others (some of them fatal), which had not been seen by any medical man. Of the children, there were attacked about two-thirds, or 66 per cent.; of the adults, 5 per cent. There were no supposed second attacks. Of my sixty-two cases, I took notes of thirty-six, and their chief symptoms are given in the following table. The brackets include the names of those of the same family, or living in the same house, who were not seized with the epidemic.

To take the averages of these 36 cases, the age of the youngest patient is nine months and of the oldest fifty-one, the average being ten years and five weeks. There is a difference in the comparative number of the sexes attacked;—27 females to 9 males.

The premonitory Symptoms were languor, lassitude, headache, general pains, and heat of skin, in a few instances vomiting. When such symptoms appear at a time when there is scarlet fever in the house or vicinity, it is likely they will end in the same; but in other instances, and taken by themselves, they do not foretell scarlatina more than other diseases. In the table they are sometimes stated to have been absent, but they may have been occasionally unnoticed by the parents.

Cynanche appeared in 20 cases before the rash, after it in 11, and in 5 they appeared together; it was absent in two cases in 36, and in the remaining 34 it lasted on an average four and three fourth days, the shortest being one day, and the longest twenty-eight. In case 35 the sore throat was noticed by the patient only at night.

The Rash was present in 33 cases among 36, and lasted on the average five days and a half, the shortest being one day and the

* Dr Alison's *Physiology*, 1839, p. 456, and Dr Pritchard's *Physical History of Mankind*, 1836, Vol. i. p. 151.

† The *fièvre rouge* is called *mishwushawin* in the Chipawa language.

TABULAR VIEW OF THIRTY-SIX CASES OF SCARLATINA.

Date of attack.	No.	Name.	No. of the others in the same house not attacked.		Age.	Premontory symptoms lasting hours.	Cynanche lasting days.	Eruption lasting days.	Whether cynanche or eruption appeared first.	Dequamation lasting days.	Dropsy lasting days.	Kind of dropsy when any.	What glands much affected.	Days sick.	Event.
			Adults.	Child.											
1843	1	Marie Demaison	3	...	4	12	14	3	Cynanche	2	...	...	Parotids none	20	Cured
Oct. 30.	2	Catherine Dollar	...	...	9	...	4	3	Do.	1	...	...	Do.	8	Do.
Nov. 1.	3	Rosa D.	2	...	4	...	6	2	Do.	...	...	...	Do.	7	Do.
Nov. 1.	4	Jean D.	...	...	7	6	4	0	Do.	...	...	...	Do.	5	Do.
1844.															
Jan. 21.	5	Margaret M.	...	...	5	6	3	6	Do.	5	4	Anasarca	Do.	15	Do.
Jan. 24.	6	Jessie M.	...	...	13	12	1	1	Do.	4	...	...	Submaxillary none	6	Do.
— 26.	7	Emily M.	2	2	14	6	...	3	Eruption	...	...	...	Do.	3	Do.
— 29.	8	Jane —	...	...	18	12	2	3	Do.	6	7	Anasarca	Do.	16	Do.
— 21.	9	David M.	...	...	8	24	3	5	Cynanche	14	...	...	Do.	20	Do.
Feb. 5.	10	Andrew M.	...	...	8	10	2	7	Eruption	35	...	...	Do.	42	Do.
— 10.	11	Agnes D.	3	...	6	...	3	5	Cynanche	7	87	Anasarca	Do.	15	Do.
— 16.	12	Harriet D.	...	...	6	...	2	4	Do.	10	...	...	Do.	52	Do.
— 4.	13	Ann Jeffrey	...	...	6	24	5	5	Together	16	...	...	Do.	23	Do.
— 6.	14	Maria Jeffrey	...	...	8	20	4	5	Do.	14	2	Anasarca	Do.	22	Do.
— 18.	15	Harriet J.	4	...	5	14	1	8	Eruption	10	...	...	Do.	18	Do.
— 20.	16	James J.	...	...	14	6	4	7	Do.	13	...	...	Do.	19	Do.
Mar. 31.	17	Hannah Copland	3	1	3	...	17	9	Together	9	...	...	Both submaxillary and both parotids, none	17	Died
April 5.	18	Mary A. C.	...	...	7	...	...	3	Eruption	2	...	...	Do.	5	Cured

The brackets include those in the same house. *Note to Cases.*—3, 4, 7, the redness of skin fugacious, or the spots disappearing for about an hour, and then returning.—10 and 14, the rash extended over the whole body.—11 and 18 were not confined to bed.—17 exhausted by the great swelling and inflammation of the glands.—15, inflammation of the mucous membrane of the vagina.

ANALYSIS OF THIRTY-SIX CASES OF SCARLATINA—Continued.

Date of Attack.	Name.	No. of the others in the same house not attacked.		Age.	Prenatal symptoms lasting hours.	Cynanche lasting days.	Eruption lasting days.	Whether cynanche or eruption appeared first.	Desquamation lasting days.	Dropy lasting days.	Kind of dropy when any.	What glands much affected.	No. of days sick.	Event.
		Adults.	Child.											
1844.														
Feb. 4.	19 Mary A. Russel	...	...	4	1	3	9	Eruption	3	...	{ Anasarca & } Ascltes	none	11	Cured
— 9.	20 Rebecca B.	...	...	6	2	5	7	Cynanche	6	27	...	Parotids	46	Do.
— 9.	21 Adelaide B.	2	1	3	12	2	8	Eruption	5	...	...	none	13	Do.
— 17.	22 Caroline Phipps	...	...	25	10	28	...	Cynanche	1	...	...	Do.	30	Do.
— 26.	23 Agnes C.	...	...	9	1	6	5	Do.	...	...	...	{ Submaxill. & Subling. Parotids }	6	Died
— 26.	24 Sarah Columbus	...	...	7	...	4	7	Do.	8	6	Anasarca	none	35	Cured
March 2.	25 Francis C.	3	...	13	...	8	...	Do.	1	...	...	Do.	11	Do.
— 1.	26 Christopher C.	...	...	11	...	4	8	Do.	19	...	...	Do.	28	Do.
Feb. 20.	27 Henry Jeffrey	...	...	5	...	4	9	Eruption	15	21	{ Anasarca & chro- nic Hydroceph.	Do.	85	Do.
Mar. 27.	28 Mrs E. J.	1	1	30	...	6	7	Cynanche	18	...	...	Do.	20	Do.
— 26.	29 Alfred J.	...	...	0½	...	4	1	Do.	...	...	...	{ Submaxill. & Parotids }	4	Died
— 12.	30 Louise Leroux	2	...	11	6	5	7	Eruption	8	...	...	Parotids	19	Cured
— 18.	31 Harriet Bell	...	...	4	...	5	5	Cynanche	...	...	...	none	5	Died
7.	32 Caroline B.	...	...	19	6	2	10	Do.	14	3	Anasarca	Do.	25	Cured
— 12.	33 Mr B.	...	...	51	...	4	4	Do.	3	...	...	Do.	9	Do.
— 16.	34 Mrs B.	...	...	43	...	3	3	Do.	...	...	...	Do.	7	Do.
— 24.	35 Adriana B.	...	...	14	...	2	6	Together Eruption	12	...	...	Do.	14	Do.
May 12.	36 Susan Warren	5	2	7	12	5	6	Together	5	...	...	Do.	14	Do.

Note to cases.—22 and 25 are cases of scarlet sore throat.—29 is the youngest case, being nine months; the rash was streaked and linear.—33 is the oldest case; this case and case 35 were not confined to bed.—27 had anasarca and a return of chronic hydrocephalus, to which he had formerly been subject.—34, the catamenia present on 13th, 14th, and 15th March.—28, the rash was over the whole person.

longest ten; in five or six instances it covered the whole person; in others it was in patches about the size of the hand; in some in smaller patches and spots; in others punctuated, and in one in lines. In the universally-covered it was brighter than in the others.

Desquamation took place in 29 cases among 36, and lasted on an average nine days and one-fifth, the shortest case being one day and the longest thirty-five. The old cuticle peeled off in large patches from the hands and feet, and came off in small scales from the rest of the person. In some instances roughness of skin was observed at one part, while another was still occupied by the rash; in others it did not appear till after the eruption was entirely gone, and in some a few days intervened between the disappearance of the rash and the appearance of the desquamation.

Dropsy appeared in 8 cases in 36, or one in four and a half, and lasted on the average thirteen and a half days, the shortest being two and the longest thirty-seven. In 6 cases there was œdema or anasarca, commencing generally in the face and lower extremities; in one case anasarca and ascites, and in another anasarca and a return of chronic hydrocephalus,* to which the child had been formerly subject; in 1 or 2 cases dropsy appeared before desquamation was finished, in 2 not till it was over, and in other 2 not till ten days or a fortnight after all roughness of the skin had disappeared.

The Salivary Glands were considerably affected in 8 cases in 36, or 1 in $4\frac{1}{2}$ cases; the great inflammation and swelling of both the parotids and of the sublingual and submaxillary glands was the chief cause of death in case 32 (Hannah C.); in the other seven instances the inflammation ended in resolution.

The Duration of the shortest case was three days, and that of the longest forty-six, the average being nineteen days and one-third.

The Fatal Cases. Besides the symptoms given in the table, and the general treatment to be mentioned in another paragraph, some further account of the fatal cases may now be given.

Hannah C., (case 17), aged 3, on March 31 was affected with cynanche and a rash over the whole person. April 3. I saw her for the first time. The rash is universal, of a shade paler than at first; cynanche; swelling of parotids; is restless; hair to be cut short; cloths dipt in iced water to be applied to the head; face and arms to be frequently sponged with cold water; to have purgative medicine. April 5. Four stools yesterday; less eruption; more cynanche and swelling of all the salivary glands; leeches

* The iodine injection is useful in hydrocele and ascites, and are there not some instances of congenital and chronic hydrocephalus where it might be found the same?

would have been useful but they could not be procured ; blisters were ordered ; the other treatment will be noticed in a succeeding paragraph. The cynanche was very severe, and the great swelling of all the salivary glands interfered with breathing and swallowing, and much distressed the child, who died on the 17th day. The parents refused a sectio. (This patient's sister had the disease so mildly that she was not confined to bed ; the other child in the house not attacked, was an infant five months old.)

Agnes C., (case 23), aged 9, suffered from the symptoms mentioned in the table. The headach and heat of skin, which were great, were much relieved by cold sponging ; the cynanche was severe, and a blister which was applied was, by the carelessness of the relatives, not left on long enough to have any effect ; a second blister gave some relief. The relations were very indifferent about attending to her, and gave contradictory accounts at every visit. On the sixth day of the disease she died, partly from the violence of the general fever, and in part from the cynanche.

Inspection twenty hours after death, when time was given to examine the throat only, disclosed the following appearances. There was redness of the mucous membrane of the mouth, fauces, pharynx, and larynx ; in the larynx were scarlet lines and patches ; in the gullet scarlet spots ; the tongue, sublingual, and submaxillary glands much swollen ; the tonsils swollen and ulcerated.

Alfred J., (case 29), aged 9 months. On March 24th was taken out to Mr B.'s house, where there were several cases of scarlatina. The weather was bad, and he got from the exposure catarrh and sore throat, to which was added, on the 26th, scarlatinous cynanche. On the 28th, during the whole day, the entire person was covered with scarlet streaks and lines. The catarrh made it difficult for him to breathe through his nostrils, so that he could not easily suck. His mother had scarlatina at the same time, (the secretion of milk ceased), and they could not get a wet-nurse for him. Under this complication of unfavourable circumstances, with much swelling of the glands and diarrhoea on the last day, he sunk on March 29th, on the fourth day of the disease.* As from the size of the house a dissection could not be made without his mother's knowledge, on account of her dangerous state, it was not proposed.

Harriet B., (case 31), aged 4. March 18th, at 12 A. M. felt

* As scarlatina is seldom seen in one so young, I have been particular in detailing this case. Some may consider that the sore throat on the 24th and 25th was the beginning of the scarlatina, but from the bright redness on the 26th and the other circumstances, I am inclined to think that it was at first common cynanche and then scarlatinous. His mother, Mrs E. J., (case 28), was attacked on March 27th, and on the 28th there was hardly any milk, and none after it. In her the redness was universal, and her recovery was slow, the case being complicated with grief for the loss of her child.

quite well and was running about. At 1 P. M. lay down, feeling headach and cynanche. 19th, Vomited two round worms, had turpentine followed by infusion of senna and sulphate of magnesia; hair to be cut short. 21st, Delirium last night; to have a turpentine enema; cold affusion on the head. The symptoms are given in the table, and the general treatment in another paragraph. The fever is intense and the cynanche severe; the abdomen is livid, with a few red spots on it, on the thighs large scarlet spots, on the cheeks scarlet spots remaining for an hour or so, and then returning; about 11 A. M. a little throat-rattle at times; hot flannels to the feet, gruel and wine to be given at intervals. In the night some of the scarlet spots became livid, and on March 22d at 5 A. M. on the fifth day of the disease she expired.

Inspection thirty-four hours after death gave the following results. Over the chest and part of the legs a livid colour; on the inner part of the thighs some redness; the face more livid than yesterday; not much emaciation, as she was ill only three whole days and a half; the tongue much swollen; the mucous membrane of the pharynx red, and that of the larynx and trachea having scarlet spots, the intervening membrane being nearly of the natural colour. There was not time or convenience for examining the head and other parts. There were no throat symptoms or *post mortem* appearances sufficient to account for the fatal event, which may be referred to the intensity* of the febrile commotion.

The father and sister of this patient had the complaint so mildly that they were not confined to bed.

Scarlet Sore Throat.—The epidemic appeared under three forms:—I. Cases where there was both cynanche and rash; of this kind there were 31 in 36. II. Rash and no cynanche; two cases, Nos. 7 and 18. III. Cynanche and no rash; three cases, Nos. 4, 22, and 25. Of these three forms of the complaint, the first two are called scarlet fever, and the third scarlet sore-throat; any instances where there is a slight and partial eruption, for an hour or two, of only a few red points, may, with sufficient correctness, be placed with the third kind.

The Diagnosis of scarlet sore throat is not always of a very positive kind; but we may consider it to be this disease if, 1st, the person has not had scarlatina before; 2dly, he be living in a house where there is scarlatina, or if in any other distinct way he has been exposed to its contagion; and, 3dly and chiefly, if the redness of the throat be nearer a scarlet colour than it usually is in common cynanche, the opinion will be confirmed if any desquamation occur, which it is apt to do, on the feet, hands, or other parts. It seems strange that there should be desquamation where

* See Dr Craigie's *Practice of Physic*, 1837, vol. i. p. 443.

there has been no previous rash observed ; but as a fugacious* and partial eruption in the night might not be noticed, perhaps this happens in such cases.

Does an attack of scarlet sore throat give immunity from one of scarlet fever ? Is the converse of this also the case ? And is one safe from a second attack of scarlet sore throat ? An affirmative answer to these questions seems, at first sight, the most likely one, though some physicians are of an opposite opinion. With regard to case 22, I may mention that the relatives were doubtful of its being scarlatina, and case 25 they felt certain was not so ; case 22 had never had scarlatina.

Treatment.—Emetics were not prescribed in any of the cases ; they are most suitable at the beginning of the disease, and many patients were not seen so early. The headach was treated by the hair being cut short, and by a careful use of the cold affusion and by cold sponging. For the heat of the skin cold sponging was grateful and efficacious ; in some instances it was used with some reserve, and, if any bronchitic symptoms threatened, it was confined to the face and limbs ; a careless nurse was not allowed to practise it ; after the child might have become pretty cool, and if desquamation appeared at one part, any remaining rash was not treated in this way. As a common drink, iced water was prescribed ; several patients said that this “ felt hot,” and a small quantity of snow taken into the mouth felt very grateful to several patients. When desquamation has set in, the process is expedited by an occasional warm bath. The cynanche was treated by blisters and occasionally by gargles. For the general fever, headach, cynanche, swelling of the glands, and dropsy, purgatives were freely given.

Cases 10 and 22 were in a weak and low state for about ten days, and wine was ordered. These were the most dangerous of the cured cases. Wine was prescribed for case 28 for a few days, though here it was only useful, not absolutely necessary. These were the only ones of the cured cases where wine was employed.

Remarks.—Some of the cases ending in dropsy were rather slow in advancing to recovery ; but this arose not so much from the nature of the disease, as from the relations not practising the directions given them ; for œdema, anasarca, and ascites, after scarlatina, generally yield readily to the steady use of purgatives. These dropsical cases could always be traced to insufficient clothing, and too early exposure to cold, by going out sooner than they ought ; and to this cause alone post-scarlatinous dropsy was for-

* By a fugacious redness, some writers mean one which disappears under pressure, and others, one which disappears spontaneously, and, after an absence of an hour or so, returns, in which latter sense it is used here. In several of the cases some of the scarlet spots disappeared for an hour or two, returned for the same length of time, and repeated the same process several times in the course of the twenty-four hours.

merly attributed, though of late years another cause has been discovered in the disease of the kidneys, first fully described by Dr Bright in 1827. The former theory is supported by its apparent reasonableness, by the frequent slightness and curability of the attacks, and the permanence of the cure. The latter view is upheld by *post mortem* proofs. Dr Christison* is of opinion that, though not all cases are from granular degeneration of the kidney, yet that many are. When dropsy is slight, appears early and before desquamation is finished, and is readily and permanently cured, it is likely that it has arisen from the functions of the skin being disturbed. When it appears later, and a week or two after desquamation is over, and when it is greater in amount and more difficult of removal, it may have arisen from the granular disease of the kidney; and a third set of cases may be from both causes.

*Penetanguishene, Canada,
December 1844.*

ART. VIII.—*The Constitution and Diseases of Women.* By CHARLES BELL, M. D., Fellow of the Royal College of Physicians. (Part II. continued from Vol. lxii. p. 330.)

The functional diseases of the Uterus.—Our next object is the investigation of the diseases in which the catamenial secretion is suspended, interrupted, attended with pain, or by any other morbid symptom. Under this head are comprehended amenorrhœa, dysmenorrhœa, and menorrhagia, which are considered the functional diseases of the uterus; and they have been defined by Ashwell as “dependent on deviation from the natural or healthy action of any part of the organization, indicated by symptoms during life, which after death are found to be unconnected with discernible changes of structure.”† This definition is supported by Churchill,‡ who asserts that the functional diseases, however much they may be prolonged, have no tendency to produce organic disease either in the uterus or ovaries, and that they leave no trace of any morbid action,—a circumstance which is remarkable even in those cases where menorrhagia has proved fatal. This definition, although correct as regards the most simple and temporary forms of the uterine functional diseases, is far from being applicable to every case, or even to the generality of cases, of menstrual derangement. This class of diseases may be more properly defined as depend-

* On Granular Degeneration of the Kidneys, 1839, pp. 114, 115, 208, 269.

† A Practical Treatise on the Diseases peculiar to Women, Part i. p. 1.

‡ Diseases of Females, p. 46.

ing on a morbid or on a preternatural condition of the uterus, which, although sufficiently obvious in most cases, to the careful observer during life, is not always easily discerned after death. The cause of this will appear more evident as we proceed in the history of the different diseases.

To the above list of functional diseases most authors, along with Cullen,* have erroneously added a fourth disease, denominated chlorosis. But very slight examination into the history and character of this disease will be sufficient to show that it is not always dependent on uterine derangement, of which, although occasionally it may be a consequence, it is more frequently a cause. This is rendered evident by the fact that chlorosis often arises before the age of puberty, and consequently before the uterine organs are developed†; and have assumed the remarkable influence, both in disease and in health, which they afterwards exercise over the female system. It may further be remarked that chlorosis is not exclusively a female disease, as it is frequently met with in delicate young men,‡ which of itself is a sufficient reason for its not being classed as one of the functional diseases of the uterus.

Chlorosis is unquestionably a disease of the general system, and seems most frequently to arise from derangement in some of the organs common to both sexes; and more especially from morbid action in the stomach and bowels,§ giving rise to depraved digestion and assimilation of the food, and consequently an unhealthy condition of the circulating fluids, by which there is produced not only general bad health, but an interruption to the development of individual organs, a train of circumstances to which females are more liable from their sedentary habits.

Amenorrhœa.—This is perhaps the most common of all the functional diseases of the uterus, and it is the one which the physician is most frequently called upon to treat. At the same time it is important, not only as being often the apparent cause of sterility, but from its liability, if not checked, to terminate in diseases of the most distressing character; such as consumption, mania, apoplexy, and paralysis. It has therefore been a subject of deep interest in all ages, and has been treated at considerable length by almost every author who has written on the practice of physic from the earliest period.

Amenorrhœa is defined *an absence of menstruation*,|| and has

* Cullen's Pract. of Phys. vol. iii, p. 35.

† Gooch's Compendium of Midwifery.

‡ Mackintosh's Practice of Physic, vol. ii p. 338. Ashwell, op. cit. p. 8.

§ Burns' Midwifery, p. 145. Hamilton on Purg. Medicines, p. 89. Marshall Hall's Commentaries, p. 60.

|| Ashwell, op. cit. p. 54.

been described under two heads, which have been denominated by Latin authors, *emansio mensium*, and *suppressio mensium*. By the former term is indicated that form of the disease which occurs before the catamenial discharge has appeared; and by the latter that which takes place after the discharge has been established. Each of these forms of disease may be either idiopathic, having its cause in the uterus itself; or symptomatic, depending on a morbid condition of some of the other organs, by which the proper supply of blood to the uterus is interrupted or deteriorated in its quality. It is highly important that this distinction should be borne in mind, as we shall find that each form of the disease requires a different mode of treatment.

Emansio mensium, or retention of the catamenial discharge, may properly be divided into two classes, which will comprehend every form of the disease. These two classes differ from each other in their general character, according to the progress the patient has made towards puberty. In the one class all the characteristics of puberty are absent, and there is a remarkable girlishness in the formation and manners of the patient; in the other the general signs of puberty are present, and the catamenial discharge only seems to be required to establish the health.

1. When the catamenial discharge does not appear at the usual age of puberty the relations of the patient immediately conclude that it is preternaturally retained, and becoming alarmed, they express the utmost anxiety and impatience for its being established. The physician, however, must bear in mind the extreme irregularity in the commencement of the discharge, and be on his guard against considering every case in which it is retained as proceeding from a diseased action requiring his active interference.

In the former part of this treatise it has been stated that a diversity in the appearance of the catamenia is observable in different women in consequence of diet, and mode of life, and instances are recorded of women enjoying good health for many years after the age of puberty, and even to have become pregnant, without the catamenia having appeared.* In support of this fact Sir E. Home relates the case of a young woman who married at the age of 17, and although she had never menstruated, she became pregnant. Four months after the birth of the child she became pregnant a second time; and four months after her delivery she became pregnant a third time; she then menstruated several times before she again became pregnant. Another case is related by Keeman, in which the woman married in her twenty-seventh year, and bore eight children before she menstruated, and then she continued regular until she attained her fifty-fourth year. Again

* Rigby's System of Midwifery, p. 50.

there are cases* mentioned of women enjoying good health who menstruated only when pregnant, and who were always made aware of their being in that state by the appearance of a coloured discharge from the vagina.

Such cases of arrested catamenia seem to arise from a want of vigour in the general system, by which there is a slow development of the uterine organs; or, as it has been called by some old authors, "the blood's lentor."† Cullen says, "interruption of the menstrual flux must depend either upon the want of due force in the action of the uterine arteries or upon some preternatural resistance in their extremities." (Op. cit. vol. iii. p. 33-4.) The menses not flowing, therefore, at the period which is usual with most women is not of itself to be considered a disease. It assumes that character only when, instead of the expected menstruation, a train of morbid symptoms appears, which experience has taught us to mark as accompanying a diseased retention, and which are found to cease as soon as the discharge is established.

That deferred or suspended puberty should not be needlessly interfered with is illustrated in a most striking manner by the following cases.

Dewees‡ relates the following distressing case which came under his own immediate observation. "We but too often call to mind with bitter recollection, the fate of a most amiable and interesting young creature, for whom we were requested to prescribe for the expected menses, but who had not one mark which could justify an interference, more especially as she was in perfectly good health. She was fifteen, it is true; and this was all that could be urged by her mother in favour of an attempt to 'bring down her courses.' We relied too much on the good sense of her anxious parent, and freely explained ourselves to her,—she left us apparently satisfied with our reasoning, and we heard nothing more of the poor child for six months, when we were suddenly summoned to attend her, as she was then alarmingly ill.

"When we saw her, she was throwing up blood in considerable quantities from the lungs, and of which she died in a few days more. The distracted mother told us, that, though she appeared satisfied with what we had said when she left us, she was convinced we were wrong, and that her daughter's health required the immediate establishment of the menstrual evacuation. With this in view, she determined upon the trial of a medicine of much celebrity, vended by a quack in similar cases. She procured it, and gave it according to directions; in a few days her daughter became feverish, lost her appetite, and had frequent vomiting; her strength

* Dewees, Montgomery, Mauriceau, Levret, Baudelocque, *L'Art des Accouchemens*, Vol. i. p. 197. Daventer *Novum Lumen*, Art. Obst. Cap. xv. p. 54.

† Mead's *Medical Precepts*, p. 281.

‡ Dewees's *Midwifery*, p. 133.

diminished daily, and after a short time was confined to her bed. She called upon the "Doctor," and told him the condition of her daughter; he encouraged her to persevere; and told her that the fever, &c. was an effort nature was making for the end proposed,—she persevered, fatally persevered, for, in a few days more, she lost her only and lovely daughter. We examined the medicine which had been exhibited, and it proved to be the oil of savin."

The next case bears a great similarity in its history and results to that related by Dewees. "A young lady in a boarding school in this city, had 'passed the usual period,' but was suffering from no symptom which could be referred to menstrual retention. Some worthy old ladies, as so often happens in such cases, not satisfied with my positive refusal to give 'forcing medicines,' took it upon them to send their own doctor to see the girl, and, as he had no etiquette scruples, he visited her without communicating with me, and undertook the charge of her. The poor girl was immediately removed from the school and put under his treatment. She soon began to spit blood, and died in a few months of rapid consumption."

2. The simple and uncomplicated form of retention is not, however, common. It more frequently happens that the general health soon becomes affected and the case assumes the decided character of disease, when the patient has not only absence of the catamenia but her life is rendered miserable by numerous and distressing symptoms, varying in intensity and number in different individuals. This constitutes the second form of amenorrhœa, and it has a remarkable resemblance to chlorosis, from which it can with much difficulty be discriminated in the early stages of its attack, and if unchecked it not unusually terminates in a confirmed case of that disease.* The patient loses the gay and healthy expression of girlhood; the eyes become heavy and dull, and the eyelids are often full and livid. Severe headach occasionally supervenes, with a clammy state of the mouth, loaded tongue, which is also sometimes large and flabby and indented with the teeth; the lips are pale and a dark circle surrounds the mouth; the breath is offensive; other cases are related in which it resembled that of the cow;† the appetite is depraved, in some instances so much so that there is an irresistible desire to eat chalk, cinders, &c.: the digestion is impaired, and there is acidity, flatulence, and cardialgia, with a tympanitic state of the abdomen; the bowels are constipated and the stools dark-coloured and foetid; the urine is scanty; there is palpitation, oppression in breathing, and annoying cough, and there is danger of a ter-

* Gooch's *Compendium of Midwifery*.

† Ramsbotham's *Lect. Med. Gazette*, Nov. 1833.

mination in phthisis. There is a dull heavy pain in the left hypochondrium, which seems to be increased towards evening, &c. The pulse is small, irregular, and quick; the extremities are cold, and the feet are frequently œdematous towards evening. There is a sense of weakness amounting to pain in the back and loins; general lassitude and aversion to every kind of exertion either of mind or body. There is also occasionally great despondency, inducing the patient to believe that she is dying. In a young lady who was under my care some time ago, this desponding state of mind was a most distressing symptom both to herself and her friends; she, however, completely recovered the tone of her mind on the establishment of the catamenia.

3. When the retention of the catamenia arises from absence of the ovaries or uterus, the case is hopeless and irremediable; and the patient frequently leads a miserable and irritable existence, if she do not fall a victim to phthisis in early life. To this, however, there are many exceptions, in which robust and vigorous health is enjoyed;* but this is more likely to be the case where the uterus only is absent;† although Churchill asserts, that “the patients in whom the ovaries are absent have the body generally well developed and healthy, the circulation active and regular, the organic functions (save one) fully performed. But the breasts are not prominent, the genital characteristics and sexual propensities are not developed, the voice is deeper than usual, a slight beard appears on the upper lip, and there is a mixture of the masculine with feminine peculiarities.”‡ Amenorrhœa proceeding from absence of the ovaries is of rare occurrence, and its true nature, although suspected during life, cannot be easily ascertained; yet Ashwell informs us that he has got a lady under his care, in whom he believes that the ovaries are absent; his evidence is not quite conclusive, however, as all the symptoms he mentions might arise from long protracted retention or chlorosis. He says, “I have now under my occasional care a lady of thirty-two years of age who has never menstruated, I believe, from congenital deficiency of the ovaries, and she is never quite well. Of late, her health has been more seriously deranged; she looses flesh, has frequent febrile attacks, a troublesome cough, pain in the side and embarrassed respiration. The probable termination of this unhappy condition is phthisis. In this instance sexual development and feeling are entirely absent; nor has there ever been leucorrhœal discharge.” Op. cit. p. 55. The absence of the uterus may be discovered during life by careful examination, but the absence of the ovaries can be ascertained only by dissection. The mere defect of sexual

* Ashwell, op. cit. p. 56.

† Lisfranc, op. cit. p. 407, Cooke's Morgagni, vol. ii p. 509.

‡ Op. cit. p. 64.

passion is not to be relied on as a proof of want of the ovaries, as this may proceed from other causes.

In the two remaining forms of retention the general appearance and character of the patient are most distinct. Instead of the awkward and ungainly look of an overgrown girl, the patient presents many of the attractive characteristics of puberty, and all that seems to be required to complete her comfort and confirm her health is the establishment of the catamenia. But this discharge seems to be arrested just when the whole system is apparently fully prepared for its secretion.

This interruption proceeds from very different causes, even in individuals hitherto in the enjoyment of perfect health. In the one case, it arises from some organic lesion, or, according to some authors, mechanical obstruction in the uterus or uterine passages. In the other, some accidental external cause suspends the commencement of the function; as cold, excessive fatigue or some sudden shock to the system, as from fear, violent passion, &c. This form of the disease may also be produced by an attack of measles, scarlatina, or some of the other infantile complaints. Amenorrhœa, in such circumstances, differs from the preceding forms of the disease, not only in the general appearance and complexion of the patient, but also in the suddenness of its attack.

The organic lesions which have been found interrupting the escape of the catamenia are occlusion of the uterus, arising from absence of the cervix; extension of the lining membrane of the vagina over the *os tinæ*; adhesion of the canal of the neck of the uterus, or of the walls of the vagina, or of the labia; absence of the vagina; and imperforate hymen. Instances of each of these malformations are related by most pathological writers, as well as by authors on midwifery.*

4. When the retention proceeds from any of these causes, the health of the patient in the earlier months of puberty is, in many instances, little if at all impaired;† but as the catamenial fluid accumulates, the patient gradually begins to suffer from a sense of weight and fulness in the region of the uterus; pain in the back and loins; nausea and loss of appetite, quick pulse, and hot, dry skin; frequent desire to pass urine, or a difficulty in doing so; constipation, and violent pain in attempting to relieve the bowels. As these symptoms occur at longer or shorter intervals they are liable to be considered as proceeding from colic, only palliative remedies are had recourse to, consequently the sufferings of the patient are much aggravated at each returning men-

* Lisfranc, *op. cit.* p. 421; Mackintosh *Pract. of Physic*, vol. ii. p. 344. Burns' *Midwifery*, p. 88; Amussat, *Gazette Medicale*, Dec. 1835; Celsus, p. 392; Smellie, vol. ii. p. 14. Denman, vol. i. p. 70.

† Lisfranc, *op. cit.* p. 423; Duncan's *Commentaries*, vol. ix. p. 332.

strual period, until the abdomen becomes enlarged as in pregnancy, giving rise to the most injurious suspicions. Instances have even occurred of imperforated hymen, in which the sufferings of the patient have been mistaken for labour pains, and the hymen becoming distended and fluctuating between the labia, like the membranes, every character of approaching delivery has been supposed to be established. This took place in a case reported by Dr Macaulay;* and he was so convinced that the girl was in labour that he informed her mother, "that a little time would in all probability determine the nature of her daughter's complaint;" and left the patient. But on his return some hours afterwards he found the girl still in "*exquisite agony*," and on examining her more carefully, he discovered that what he had taken for the membranes was only the distended hymen occupying and filling up the entrance of the vagina. He made an incision into the membrane, when two quarts of thick black blood flowed out, giving instant relief; and although inflammatory symptoms supervened, they were readily subdued, and the girl made a rapid recovery. If the case be allowed to go on, as is too often done from mistaking the nature of it, the general health fails; under the constant irritation produced by the preternatural condition of the parts and the periodical increase of suffering which takes place, the girl becomes pale and emaciated; her appetite and digestion are impaired; obstinate constipation and retention of urine supervene; she acquires all the appearance of confirmed chlorosis, and ultimately falls a victim to phthisis.† Instances have occurred in which the disease has been suddenly cut short, by the pent-up menstrual fluid making its escape through the Fallopian tubes into the cavity of the abdomen, giving rise to fatal peritonitis.‡

5. The last form of retention is that which occurs just when the catamenia are about to be secreted. It takes place in those girls who have hitherto been in the enjoyment of good health, and is in general the result of cold, over fatigue, or some sudden shock of the system. Both in its cause and its symptoms it is very similar to suppression. When it takes place in the plethoric, the symptoms are usually attended by vascular excitement, and in place of the pale cadaverous hue so frequently observed in the other forms of retention, the face is often flushed, there is severe headach, accompanied with fulness and throbbing of the temples, giddiness, and suffusion of the eyes, full and rapid pulse, pain in the back and the lower part of the abdomen, with tenderness

* Smellie's Midwifery, vol. ii. p. 15.

† Mackintosh, op. cit.

‡ Gooch's Comp. of Midwifery; Copland's Dictionary; Churchill, op. cit. p. 66; Lisfranc, p. 422.

above the pubis, thirst, and feverishness; there is also sometimes hæmorrhage from the nose, lungs, or stomach. When the retention occurs in the debilitated and phlegmatic, the symptoms assume a more chronic character, and, at particular periods, there is "an attempt to menstruate," indicated by increased pain in the back and loins, weight in the lower part of the abdomen, aching at the top of the thighs, lassitude and general uneasiness, sometimes a sense of constriction at the thyroid gland, which continues for a few days and then subsides.* At these periods a slight enlargement takes place in the *cervix uteri*, particularly in those who are subject to leucorrhœal discharge.†

Cause of Retention of the Catamenia.—It is unnecessary to occupy much time in discussing this point, as the history of the different forms of the disease renders the cause sufficiently evident. The first form, which can scarcely be considered as a disease, arises in a great measure from peculiarity of constitution, and in some families it seems to be hereditary.‡ The delay in the development of the uterine organs, which occurs in this form of retention, and in the next to be considered, may be accompanied by deficient growth of the whole frame, proving that the defective development is not confined to one class of organs; or there may be a rapid growth of the body whilst that of the uterus is delayed or imperfect. When this is the case, it too often happens that there is a natural delicacy of constitution,—a source of deep anxiety to the medical attendant and friends,—requiring the utmost care and management on all their parts. If this condition have not been produced by mismanagement or by exposure to impure air, confinement in close apartments, or in schools, and unwholesome diet, it is, at all events, greatly aggravated by them; and nothing tends more to implicate the constitution with the local derangement than the overworking the mind or body of females at one of the most critical periods of their life.

The more aggravated form of retention generally arises from temporary derangement of the general health, inopportunately occurring and retarding development, and in consequence soon complicating the case. It may also have its source in much more serious causes, such as chlorosis, deep-seated disease in the lungs, mesenteric glands, or heart affection resulting in a tedious if not an altogether hopeless case.

That form of retention which depends on absence of the uterus, ovaries, or vagina, is obviously congenital, whilst that which pro-

* Churchill, op. cit., p. 68.

† Copland's Dictionary, vol. ii. p. 837.

‡ This is the case in a young lady at present under my care. None of her relations have been known to have the uterine system matured before their sixteenth year; and although she is now past fifteen, and has had good general health, there is not the slightest appearance of approaching menstruation.

ceeds from obliteration of any of the passages may be congenital, or be occasioned by mechanical injury ; such as blows, lacerations, burns,* &c.

That form of the disease which seems to occur just when the catamenial discharge is about to be secreted, and when the system is fully prepared for the important function, which is indicated by the general appearance and manners of the patient, may be induced by the same causes which produce suppression ; such as cold, over fatigue, or whatever violently excites or depresses the system ; occasionally giving rise to congestion or inflammation of the uterus itself. This will be indicated by tenderness in the lower part of the abdomen, and other inflammatory symptoms.

Diagnosis.—It is of the deepest importance that the practitioner should form a correct opinion of the nature and cause of retention, otherwise he can have little hope of success in his treatment, and will expose his patient to the danger of converting what may be a simple case into a complicated and inveterate one. Thus if a case of retention, arising from congestion of the uterine vessels, or inflammation of the uterus, be treated as one occasioned by debility, all the symptoms will be aggravated, and the most serious consequences may result to the health of the patient. Again, if retention proceeding from any organic interruption be mistaken for a case of simple retention or chlorosis, not only will the suffering of the patient be greatly increased, but rupture of the uterus may be induced by stimulating the already over-excited and distended organ.

It is by the most careful inquiry into the history of the case, and by the attentive study of the symptoms alone, that we can hope to be enabled to pursue a successful course of treatment in an obscure form of retention ; and should we not be satisfied with the information thus to be obtained, we must then propose an examination *per vaginam*. This is a step, however, which should not be proposed unless there is an urgent necessity for it, and it ought to be performed with the greatest possible delicacy and gentleness, and always in the presence of the mother, or some other respectable female relation or attendant. In order to elucidate the points which a manual examination is so well calculated to bring out with the least annoyance to the patient, it is necessary that the physician should have a defined and accurate idea of the information which is to be obtained by this mode of examination, otherwise he will not only fail in the object he has in view, but have needlessly exposed his patient to what, with every possible delicacy, gives great annoyance and distress. He should, therefore, consider well what are the points which the other means of

* Lisfranc, *op. cit.* p. 423.

investigation have left imperfect; and when he has obtained the patient's consent to a manual examination, he should accomplish it expeditiously, at the same time exhibiting in his manner as much composure and indifference as if he were examining any part of her body, the exposure of which is a matter of indifference to her.

Examination *per vaginam* is scarcely ever necessary in those cases of retention where the usual characteristic signs of puberty are absent, as marked by the general appearance of the patient, and from the information to be obtained from female relations or attendants. Nor would it in such circumstances be expedient to attempt it, as the organs of generation in general are so undeveloped as not to admit, without much suffering, of such an examination as would be of any avail. It is only when there is reason to believe that there is inflammation in the uterus, or that there is some organic obstruction interrupting the discharge of the catamenia, that we may hope for much advantage to our inquiries from a manual examination. No delicacy, however, should prevent our insisting on this mode of investigation when there is the least reason to suspect mechanical obstruction; as, without the knowledge to be obtained by examination *per vaginam*, it would be criminal to proceed to the treatment of the case, especially if there were any doubt; because it not only enables us to ascertain the state of the uterus, but also to discover the precise situation of the organic lesion. If the occlusion arise from adhesion of the labia, or imperforated hymen, the nature of the case may be ascertained beyond a doubt, by examination *per rectum*, when an elongated fluctuating tumour will be felt in the course of the vagina. "On examination by the rectum, if the occlusion is in the vagina, the latter is felt to form an elongated tumour presenting distinct fluctuation."^{*}

When the obstruction is situated within the hymen, its nature will be more difficult to ascertain, as there may not only be absence of the vagina, but occlusion of the *os uteri*, as was found in the remarkable case related by Amussat,[†] which he, however, treated successfully. The existence of such cases is to be ascertained by means of examination *per rectum*, and at the same time introducing a bougie into the bladder, when the walls of these two organs will be felt to be in close contact, while the enlarged uterus will be found forming a fluctuating tumour near the brim of the pelvis. When the vagina is in its normal state, and the retention arises from occlusion of the uterus, the malformation is often more readily discovered, as in many such cases the hymen is absent.[‡]

^{*} Lisfranc, op. cit. p. 422.

[†] Gazette Medicale for December 12, 1835.

[‡] Mackintosh, op. cit. p. 443.

Treatment.—Experience goes far to prove that the further removed from a state of nature, and the higher the grade of civilization and moral restraint, the greater is the liability to hysterical derangement at the most critical periods of the young female's life. This is corroborated by the fact of interruption to the catamenia being of rare occurrence among the native Indians; and it unfortunately happens, that, while civilization thus entails uterine functional disorders on the young female, in the same proportion is she exposed to the mismanagement of the ignorant and inconsiderate physician; and all the evils of empiricism, as well as the ridiculous remedies known as "Old Women's Cures."

There is scarcely a medicine in the ancient or modern *Materia Medica* which has not been administered in the various forms of amenorrhœa; and it would therefore be an unprofitable waste of time to enter on a discussion of all the prescriptions which have been suggested as beneficial in every case of retention of the menses. Not only, however, has the *Pharmacopœia* been ransacked for all sorts of incongruous remedies, but the most disgusting substances are sometimes resorted to in order to overcome menstrual obstruction; an instance which illustrates this fact came under my observation lately in a dispensary case. The patient had been subject for many years to occasional attacks of amenorrhœa, accompanied by hysterical fits, which her mother asserted had on former occasions yielded to the remedy originally recommended to her, which had now, however, lost its effect; viz. the afterbirth of a male child toasted before the fire and reduced to powder, a teaspoonful being taken in small beer every morning "next her heart," that is fasting.

But the chief objection is not so much to the remedies themselves which have been recommended by regular practitioners, as to their being used indiscriminately, and not according to the state of the system and nature of the case; and although recovery may take place under such negligent practice, it might almost be said that nature effects the cure in spite of the doctor. We have only to look over the history of many of the cases published to see this sufficiently verified. Thus it is not at all uncommon to find the antiphlogistic and the stimulating treatment resorted to at the same time, even by some of our most intelligent authors. Churchill says, "If the patient be of a full habit, with florid complexion, &c., and we find the symptoms indicating uterine effort, present venesection will very often afford relief." From the circumstances here mentioned we have every reason to suppose that congestion or inflammation of the uterus or its appendages is present; yet in the next sentence we are desired to advise "as much exercise as possible should be taken, provided the patient do not

over fatigue herself. A brisk purgative may occasionally be necessary, and moderate doses of aloes in combination with rhubarb and assafoetida two or three times a week.* What could be said of such principles of treatment were it recommended in inflammation in other parts of the body? It is not my object, however, to criticise the treatment of other authors, but to impress the indispensable necessity of a strict attention to the diagnosis of the case as the only means of directing the practice. But I may here remark, that practitioners are too apt to consider that the whole object of their treatment is to procure a coloured discharge from the uterus, as if this were all that is necessary for the establishment of the patient's health. This, however, is a most mistaken and not always a safe opinion, as to it may be ascribed the pertinacity with which some resort to the use of powerful remedies, such as cantharides, and the no less dangerous practice of injecting stimulating fluids into the vagina and uterus, the use of medicated pessaries, and the insertion of bougies into the neck of the uterus.† These proceedings are liable, unless resorted to with great caution, not only to give rise to serious inflammation in the uterus and vagina, but to produce fatal peritonitis, several cases of which are adduced by Ashwell.‡ Although the production or restoration of the catamenial discharge is most desirable, still our chief object should be to re-establish the general health, as not only the safest but often the most effectual means of inducing the uterine function.

In laying down rules for the practice in amenorrhœa, the same arrangement will be adopted as in the description.

First, amenorrhœa, in which the only morbid symptom is the absence of the catamenia.

It is very questionable if any decided medical treatment should be followed in this case, farther than attention to the digestive organs. The stomach and bowels should be kept regular by mild medicine; regular and moderate exercise in the open air should be enjoined, and, if possible, in the country. Riding on horseback is often very useful, but when this is not to be obtained, walking exercise without over-fatigue is to be daily resorted to. If sea-bathing agree, that is, if the patient feel in a glow of heat after coming out of the water, and ready for her food, it may be used with advantage; but on no account is it to be persevered in if the patient feel chilled or if her skin remain blue for some time after bathing. Should the bathing disagree she may occasionally take a hot bath. The diet should be light and nour-

* Churchill on the Principal Diseases of Females, p. 70.

† Mackintosh op. cit. p. 341. Dewar's Midwifery, p. 135. Lavagna, Barough's Method of Physic, &c., p. 188.

‡ Op. cit. p. 75.

ishing ; but high seasoned dishes, and every thing likely to produce indigestion, is to be avoided. Rules on this subject, however, must be much modified by the rank and habits of the patient. In treating a young lady it is sometimes necessary to prescribe one or two glasses of wine. The clothing should be adapted to the season, but at all times flannel should be worn next the skin ; and as young ladies in such circumstances are liable to have cold feet, they should wear worsted stockings all the year round, and every exposure to damp, especially in the feet, is carefully to be avoided.

In addition to exercise and out-door amusements, cheerful employment should be provided for her while at home. The patient should not be kept in close or crowded rooms, and her sleeping apartment, especially, should be large and airy. In this climate, where it is so often unadvisable to expose delicate girls to the open air, in-door exercise, such as dancing, skipping, and other calisthenics, may be used with advantage. It is necessary, however, to be careful that these exercises are not carried to excess, as all over-fatigue is particularly injurious.

While every effort is thus made to invigorate the system, it is necessary that the patient should be carefully watched, so that we may be prepared for the very common occurrence of what I have considered as another form of retention taking place.

2. In the second form of amenorrhœa there is a decided morbid state to be overcome, and the greatest care is necessary in our treatment, as it frequently happens that patients who suffer from this form of the disease have a hereditary delicacy of constitution.

In this form of retention the bowels are in general constipated, and often obstinately so. The first step therefore is not only to relieve the loaded state of the alimentary canal, but to establish a free and wholesome condition of the alvine discharges. If this be accomplished it will generally relieve the violent headach so commonly present, and also the lassitude and dislike to every kind of exertion so annoying to the patient herself, and so great a hindrance to the success of treatment.

With these views it is generally advisable in the outset to exhibit calomel, and, from the prejudice which so often exists against this invaluable medicine, it is better not to publish the nature of the remedy administered. From three to five grains of calomel at bed-time, followed in the morning by a dose of castor oil or senna, will be found very useful. It may be as well to observe here, once for all, the importance of carefully noting the condition of the alvine evacuations, which is at no time more indispensable than in the derangements of the uterus. Free action of the

bowels is seldom all that is required ; a careful examination along the course of the colon will often enable the experienced practitioner to ascertain the existence of scybalous collections. These must be discharged, and it is not by violent cathartics that this will be accomplished, but by the daily use of well-combined purgative medicines. A combination of aloes, sulphate of iron, and extract of henbane, has not only the advantage of acting on the lower intestines, but it also produces an emmenagogue and tonic effect on the system of considerable power. It may be necessary, from the extreme torpidity of the bowels, to increase the cathartic tendency of the medicine by adding colocynth or a little pure scammony. I sometimes find it more manageable to give the chalybeate in the form of the muriated tincture of iron, administering aperients only, in the pills. When there is much languor in the circulation and nervous energy, camphor proves a most valuable remedy. All that has been recommended in the first form of amenorrhœa with regard to diet, clothing, air, and exercise, &c. must be strictly enforced here. The tepid bath, either of salt or of fresh water, and the flesh brush are valuable assistants in the treatment. The cough which not unusually accompanies this disease, and the pain in the left hypochondriac region, which in general is increased towards evening, being most frequently only sympathetic, seldom requires active remedies, and usually disappears under the general treatment. Some of the simple emollients and expectorants may be prescribed, however, to allay the cough. Should the pain in the left hypochondrium be troublesome, sinapisms and rubefacient liniments will generally be sufficient to give relief ; but, should these fail, more decided counter-irritants must be had recourse to. On no account should general depletion be resorted to.

By persevering with the above mode of treatment there will be every reason to expect that the general health will improve ; and it is right to observe, that chalybeates require, in many instances, to be long exhibited before their full beneficial effects are produced. If successful in restoring the general health, the establishment of the function of the uterus is almost certain to take place. Should this, however, not be the case, and should no appearance of the catamenia occur within a moderate period, we may then proceed on the conclusion that there is local torpidity, and excite the uterine organs by the exhibition of more decided emmenagogues. The *modus operandi* of the medicines thus denominated, however, does not, on all occasions, seem to be easily understood ; and if it be admitted, that the catamenia depend upon " the discharge of an ovum," the explanation is still more difficult ; for although it may be obvious that violent stimulus ap-

plied to a secreting organ will bring on or increase its secretion, it does not so readily appear how an ovum, which has to undergo so many phases of development before it is in a condition to be expelled from the ovary, should be so suddenly brought to that state of maturity.

Of the class of remedies denominated emmenagogues, the most efficacious, and the one which has had many advocates, is electricity, a single shock having been known to cure amenorrhœa. Electricity, however, requires some caution in its use, as its effects are highly stimulating, and if it be used in excess it may destroy the excitability of the uterus altogether. It should not be resorted to until there is a certain degree of improvement in the general health; neither should it be used when the patient greatly dreads its exhibition, because it may depress the nervous energy, and so protract the malady; and should it produce syncope, or if sickness and diarrhœa follow its use, it must be discontinued.

Strychnine has been recommended by Dr Bardsley in his Hospital Reports, as being a very effectual remedy in suppressed menstruation; and it has therefore been concluded* that it might be equally successful in this form of amenorrhœa. This opinion is supported by Copland's experience of other preparations of the nux vomica, especially the extract, which he has found most useful, in combination with aloes, in "stimulating the uterine organs, and improving the tone and vigour of the system."† Strychnine is a medicine which must be carefully watched by the practitioner, as it acts most powerfully on the brain and nervous system, even in the smallest doses sometimes producing alarming spasmodic affections of the muscles all over the body. As it unquestionably acts on the generative organs, it is a medicine which will be found, when carefully exhibited, to stimulate the uterus, when retention of the catamenia arises simply from torpidity of that organ.

Iodine is also regarded as an effective emmenagogue; but the experience of its use has not yet been sufficiently extensive to give confidence in its powers in this respect. It undoubtedly stimulates the mucous membranes and the glandular structure, and excites the genital organs; but as it also brings on debility in the digestive functions, with the natural consequences, weakness and emaciation, it must be resorted to with great caution, when there is so much reason to dread debility, or any thing that will weaken the chylopoietic organs; and it must not be exhibited for any lengthened period continuously. If this be not attended to, all the evils of iodism may be produced,—a condition which more readily takes place in some constitutions than in others.

Savine is also a medicine of high repute as an emmenagogue,

* Churchill, *op. cit.* p. 72.

† Copland's *Med. Dictionary*, vol. ii. p. 839.

and has been long known among the lower classes of society as an irritant of the womb, and on that account has frequently been resorted to for the purpose of producing abortion. From its violent irritant effects, not only on the womb, but on several other organs of the body, especially the liver, it is a medicine which requires great care in administering it; and it should be given only in those cases in which such mild means as are recommended above have failed; and when there is reason to believe that, from the torpid condition of the uterine vessels, no good can be attained until they are strongly stimulated into action. In such cases I have used the oil with apparent advantage.*

3. The third form of retention is beyond the power of medicine, and it is therefore of vital importance to form a correct diagnosis, as it is evident that all attempts to force a secretion when there are imperfect or absent organs, must do nothing but harm. All that we have to do in such cases of malformation is to attend to the general health of the patient, and to remove or alleviate any morbid symptom which may occur, by the mildest means possible, avoiding emmenagogues.

4. We have now to consider the treatment of that form of retention in which the catamenial discharge is actually secreted; but in consequence of some preternatural state of the passages the fluid is retained within the uterus, or in the vagina and uterus. There is no remedy for such cases but by a surgical operation. It is of much consequence to ascertain early in the treatment the nature of the case, with a view to remove the obstruction; as there cannot be a doubt that many of the unsuccessful cases of operation in this form of amenorrhœa is to be ascribed to delay; by which the parts have become so irritated from distension that they readily inflame. Before operating, however simple it may appear, the bowels should be freely acted on, and the bladder emptied by the catheter. At the same time, we should endeavour as much as possible to allay any constitutional irritation. The propriety of attending to have the rectum and bladder emptied will be apparent to every one who considers, not only the contiguity of the parts, but the almost invariable tendency in such cases to feculent accumulation in the rectum and colon; and how frequently the bladder gets into an unnaturally insensible state. By attending to these rules, and by enforcing the most perfect rest in the recumbent posture for some days, we shall take the best means to secure the patient against bad consequences from the operation. With regard to the method of operating best adapted to the case, this will depend in a great degree on the seat of

* Dr Pereira agrees with Dr Home in considering savine "the most powerful emmenagogue in the whole *Materia Medica*."—*Elements of Materia Medica*.

the obstruction. If the obstruction arise from adhesion of the labia, the parts must be separated by careful dissection with the scalpel; but when there is merely imperforate hymen, an incision may be made through it by a common lancet.* When the *os tincae* is the seat of occlusion the operation is a little more complicated, and in performing it there is considerable advantage in using the speculum, by which the uterus will be fixed and the nature of the obstruction brought completely into view, enabling the operator easily to introduce the trocar into the *os uteri*, which is generally indicated by a slight indentation, or, as it were, a "small dimple."† The opening thus made may afterwards, if necessary, be dilated by means of bougies. Should the interruption to the catamenia depend on adhesion of the walls of the vagina, our endeavours should be to separate them by means of the fingers, or the handle of a scalpel, or by the slow process of tents rather than by dissection; because by these means not only shall we be enabled to restore the vagina more satisfactorily, but we shall avoid wounding the bladder or rectum, of which there is great risk, if the scalpel be used, even by the most skilful hands,‡ in consequence of the near neighbourhood of these organs, and the thinness of the intervening coats. When the vagina is absent it is still more imperative to adopt this caution and slow process of establishing an artificial passage, for in such circumstances, of course, there is greater risk of producing a fistulous communication with the rectum or bladder. A most interesting case of this kind of imperfection is related by Amussat,§ which he treated with perfect success, although the case was rendered very slow apparently, from the very defective after treatment.

In every case the passages should be syringed with warm water after the pent-up secretion has been allowed to escape, so that the whole may be discharged; for although the catamenial fluid, when excluded from the air within the womb, as it were hermetically sealed, may continue undecomposed, it is apt to become putrid when exposed to the influence of the atmosphere, and become a source of irritation. When the menstrual accumulation has been completely removed, our next care should be to prevent the newly made passage being closed by adhesion, and a worse condition of the parts follow, exposing the patient a second time to all the pain and anxiety of an operation. An unfortunate case, which illustrates this fact, is related by Ashwell.|| The girl who was the subject

* Duncan's Annals of Medicine, vol. i. p. 349.

† Mackintosh, op. cit. p. 344.

‡ See a Case related by Boyer.

§ Gazette Medicale, 12th December 1835.

|| Op. cit. p. 86.

of this case died soon after the performance of the second operation. In order to prevent reunion of the passage we should introduce oiled tents, and afterwards enjoin the patient to wear one of Professor Simpson's pessaries for some time, or to have a bougie introduced regularly. After the immediate effects of the operation are over and all risk of inflammation at an end, we should, with the hope of re-establishing the patient's health, have recourse to tonics, aperients, and exercise.

5. In the management of the fifth and last form of retention which I have described, it is necessary to adopt more active measures, as we have not only a local congestion or inflammation to overcome, but frequently general excitement and fever. In this condition of the female system, a strict adherence to the antiphlogistic treatment must be adopted until all pain and inflammatory symptoms are relieved. Besides acting freely on the bowels with calomel and saline medicines, it will be necessary to reduce the force of the circulation by means of depletion: and the most efficacious mode of doing so in all uterine complaints is by leeches applied, when possible, to the uterus itself; but as this is difficult in a young girl, they should be applied to the perineum, or within the labia. The leeches should be repeated with an interval of a day or two, so long as there is any pain, bearing down, or irritation and heat in the urinary organs. Antimonials, combined with opium or Dover's powder, will prove of great use in allaying the sufferings of the patient. When the pain and fever have been subdued, it is not necessary immediately to endeavour to establish the catamenia; for although our treatment sometimes appears to produce at once the function of the womb, it is far from being advisable to "force the organ;" for a premature attempt to produce menstruation may bring on a return of irritation and inflammation, and make the case more aggravated than before. If the catamenia do not appear in the course of a few weeks, however, and the system remain quiet, the case may then be viewed very much as coming under the second head of retention, and treated on the principles already laid down.

(To be continued.)

ART. IX.—*On the Medicinal Properties of Bebeerine.* By
DOUGLAS MACLAGAN, M. D., F. R. S. E., &c.

IN April 1843, I communicated to the Royal Society of Edinburgh some chemical and pharmaceutical remarks on the Bebeeru, or Greenheart Tree of British Guiana, in which Dr Rodie of that colony had pointed out the existence of a vegetable alkali which he called Bebeerine, and which he considered to be possessed of

antiperiodic virtues. This paper has appeared in the *Transactions of the Royal Society*, Vol. xv. In August of the same year I published in *Cormack's Monthly Journal* a few observations on the medicinal qualities of Bebeerine, in which I narrated a series of cases furnished me by others, or observed by myself, which served to show that bebeerine is possessed of considerable antiperiodic and general tonic qualities, resembling quinine in its general effects, but without its liability to excite the circulation or produce the constitutional irritation to which the cinchona alkalies are too apt to give rise.

My present object is to lay before the profession further evidence as to its powers, with a view to its being employed, if it stand the test of experience, as a substitute for quinine.

Before, however, narrating cases illustrative of its medicinal action, I may be allowed to mention one or two points of information which I have gained regarding its natural history and pharmacy, since the date of the above papers.

In my communication to the Royal Society I stated that the plant was unknown to me, and that although it had been referred to the natural order *Lauraceae* by Hooker, Lindley, and Schomburgk, nothing precise was known regarding it. Since that time flowering specimens of the plant, which were sent to me by Dr Watt of Demerara, and especially the examination of the plant by M. Schomburgk, have confirmed its lauraceous origin, and Schomburgk finds it to be a species of the genus *Nectandra*, to which he has given the specific name of *N. Rodiei*, in honour of Dr Rodie, the original discoverer of its medicinal powers. (Hooker's *London Journal of Botany*, December 1844.)

With regard to the chemical history of the active principle, I may state that subsequent trials have led me to believe that what I described as a second alkali, under the name of Sipeerine, is only a product of the oxidation of bebeerine, and that there is really only one alkali in the bark. My other avocations have prevented me from completing an inquiry into its ultimate chemical constitution, in which I have been engaged along with Professor Tilley of Birmingham. This investigation is now in progress, and, as I have put a portion of the sulphate into the hands of Professor Liebig, I hope also soon to learn that it has been examined in the Giessen laboratory.

A more important fact in relation to our present object is, that a very great improvement has been effected in the manufacture of bebeerine intended for medicinal use. I cannot refrain from noticing the spirited exertions made by Mr J. F. Macfarlane of this city, and the continued perseverance of Mr Brown, the superintendent of his laboratory, to improve the quality and appearance of the salt; and I am glad to have this opportunity of saying, that

the latest manufactures bear ample testimony to the success of their endeavours. The principal point in which the more recently made sulphate seems to have the advantage over former manufactures is, in the salt being kept a little basic, in which condition it is not so liable to be affected during drying as the completely neutral salt is. The only difference resulting from this is, that, like disulphate of quina, it requires the addition of a few drops of sulphuric acid to form a perfect solution. On comparing this salt with perfectly neutral sulphate, analyzed by myself in the course of my former experiments, I find that the comparative constitution of the two salts, when carefully dried, is the following:—

Neutral sulphate, MacLagan, Trans. Royal Soc. of Ed. Loc. cit.		Mr Macfarlane's basic, Commercial sulphate.	
Bebeerine,	36.39		90.83
Sulphuric acid,	13.61		9.17
	100.00		100.00

The salts are anhydrous. Mr Macfarlane's preparation (after being carried to my class-room in a paper instead of a bottle) contained only 0.11 per cent. of hygrometric moisture.

I may further add, that Mr Macfarlane finds that he will probably be able to sell the sulphate at 6s. per oz. This is less than one-half the price of sulphate of quinine, which now costs 12s. 6d. per oz.

In adducing further evidence of the medicinal virtues of Bebeerine, which is my object at present, I shall confine myself to those testimonies to its value which I have received from other quarters, contenting myself on my own part with the general statement, that I have not met with any circumstances tending to shake the opinion expressed in the following sentence, which I quote from my paper in Cormack's Journal for August 1843. "As regards the features, which are characteristic of Bebeerine as a therapeutic agent generally, I think that the above cases entitle us to consider that it is a marked antiperiodic and tonic, and consequently that there is good reason to believe that it may be applied to the same purposes for which the more expensive quinine is employed."

I shall first give the more recent reports which I have got, regarding its action in remittent and intermittent fevers, along with a tabular view of all the cases treated by it with which I am acquainted, and then notice its employment in periodic headach, neuralgia, &c.

Intermittent and Remittent Fever.—My friend Dr Watt of Georgetown, Demerara, whose first series of cases were published by me in 1843, has made farther trial of the Bebeerine, and has favoured me with the following additional reports.

CASE I.—(Quotidian.) Josephina Pereira, native of Madeira, age about 38; has been four years in Demerara, and has had frequent attacks of intermittent fever since her arrival. She labours in the cane fields, and has an infant of four months at the breast.

27th November 1843. Was seized with ague and fever on the 24th, between the hours of nine and ten A. M., and it has returned at the same hour every day since. To-day is the fourth paroxysm, and she is now (noon) in the hot stage, and vomiting. Has had calomel and jalap. No bile in the matters vomited to day; tongue clean; pulse 116. To have twelve grains bebeerine evening, and same dose at six A. M. to-morrow.

28th. Took bebeerine last evening, but did not get the dose this morning till ague was coming on, and she did not take it. Ague and fever came on at usual hour to-day. To have twelve grains bebeerine evening and twelve grains early to-morrow morning.

29th. Took the two doses of bebeerine as directed. The ague did not return at the usual hour this forenoon, and she went out to wash some clothes for her baby. Just now (noon) she has been seized with ague, and has returned to her chamber. To confine herself to her chamber entirely, and continue the bebeerine, twelve grains evenings and mornings.

1st December. No return of fever yesterday or to-day; has had one drachm bebeerine altogether; and has had no deafness or ringing of the ears or any affection of the head.

1st June. Has had no return of fever since.

CASE II.—(Tertian.) Maria de Jesus, from Madeira, four years in the colony, and occasionally subject to intermittent fever, which generally comes on every second day.

29th December 1843. Had a paroxysm of intermittent fever the day before yesterday and again to-day. Is now (noon) in the hot stage, during the cold stage vomited bile; pulse 120; skin hot and dry. To have ten grains calomel and twenty-five grains jalap now, and twelve grains bebeerine at bed-time. To-morrow to have twelve grains bebeerine morning and noon.

31st. Taken the medicines as ordered. The thirty-six grains bebeerine have had no effect upon her head. As this is her fever day let her have twelve grains bebeerine immediately.

1st January 1844.—Fever has not returned.

3d. Convalescent.

1st June. This woman soon after left the estate, and I saw nothing of her since.

CASE III.—(Enlarged Spleen and Fever.) José da Brio, from Madeira, about three or four years in the colony; very subject to intermittent fever; has a pale emaciated appearance, with great enlargement of the spleen, which extends to near the right ilium.

3d January 1844. was seized at 5 P. M. on the 1st with intermittent fever, which continued all night, but went off yesterday morning and returned again at 5 in the afternoon and continued the whole night. Skin is now (10 A. M.) moist, and pulse 90

small and soft ; tongue much furred ; stomach irritable. To have an emetic now, ten grains calomel at bed-time, and twenty-five grains of jalap to-morrow morning.

5th January. Took the emetic ; but as the fever had only remitted, and returned with increased violence towards evening of the 3d, he refused the calomel in the evening and the jalap yesterday. Yesterday there was merely a remission in the forenoon with increase of fever towards the evening. To-day he has likewise had remission of fever in the morning ; but now (1 P. M.) his skin is hot and dry, and pulse 116. Take of opium six grains ; tartar-emetic one grain ; calomel ten grains. Mix and divide into four pills. One to be given every six hours while the fever continues.

6th January. Fever still continues with remissions ; skin sometimes moist, sometimes dry, always hot ; complains of pain on pressure in the spleen. To have a blister over the spleen ; the remaining pill now, and half a drachm of jalap two hours after it. Twelve grains of bebeerine at bed-time.

7th. Fever left him last evening. Refused the blister, but took the other medicines, and has passed much bile. Twelve grains of bebeerine twice to day.

8th. No return of fever. Took two doses only of the bebeerine yesterday and the third early this morning. Slept some during the night, and feels better, but very weak. To have twelve grains of bebeerine at noon, and to be allowed a little wine, soup, &c.

10th. Has had no return of fever ; tongue cleaning ; spleen softer and smaller, and says he has no pain in it. To have thirty-five grains of jalap and one drachm of cream of tartar.

12th. Continues convalescent. Bebeerine had no effect on his head.

1st June. I believe he has had once or twice slight attacks of fever and ague since, but so slight that he has not again put himself under medical treatment.

CASE IV.—Julio de — from Madeira, aged 12, had an attack of congestive remittent fever in August last, and was insensible for two days.

January 1844. Has had tertian fever latterly. I gave him bebeerine in the same way that I usually give quinine, and the fever was completely checked. My notes of this case are lost or mislaid.

CASE V.—(*Bilious Intermittent*.) Mr William C., native of Scotland, aged 20, has been about three or four years in the colony as a field overseer, where he is constantly exposed to the sun and weather. Says that about two years ago he had yellow fever, and was very ill, since which, however, he has enjoyed very good health.

April 15th. Between ten and eleven o'clock to-day he was suddenly seized in the field with bilious vomiting and fever ; but without any perceptible cold stage. He is now (3 P. M.) sweating very profusely ; pulse 120 and full ; severe pain across the fore-

head ; urine deeply tinged with bile ; tongue covered with fur. To have four pills containing sixteen grains of the compound colocyynth mass, with twelve grains of calomel, and a full dose of Epsom salts to-morrow morning.

16th. Free of fever and headach this morning ; pills and salts have acted freely ; stools dark green at first, and now yellow ; urine very high coloured ; medicines still acting.

17th. Three o'clock yesterday afternoon the fever returned without any perceptible cold stage. Took salts again this morning, which have acted freely ; stools still very bilious and urine the same. Was seized at 11 A. M. with smart ague, which lasted nearly an hour, during which time he vomited copiously of thick yellow bile. 1 P. M., his skin is now hot and dry ; pulse 120 and full ; severe frontal pain. The head to be frequently bathed with vinegar and water, and wet cloths applied to the brow.

R. *Sulph. Bebeer.* ℥ij. et gr. viii. ; *Calomelanos*, gr. xxiv. ; *Mucilag. Ac. Arab. q. s. M. fl. massa in pil. xii. dividenda.*

Three of the pills to be taken in two hours, three again at bedtime, and three early to-morrow morning.

18th. Yesterday the sweating commenced about four, and the fever left him about seven P. M. Has had a good night, and taken nine of the pills as directed. No pain nor fulness in the head, and is quite certain he has had no ringing in the ears ; tongue still much furred ; pills have acted thrice on his bowels ; urine scarcely so high in colour. To have forty-five grains of jalap with some cream of tartar.

19th. 7 A. M. No return of fever. The jalap acted scantily, having vomited about an hour and a half after it was taken. Had a good night, and this morning feels inclined to eat ; pulse 80, and natural ; tongue still covered with a greenish fur ; urine deeper in colour ; eyes slightly yellow. To have three of the pills of bebeerine and calomel now.

1. P. M. Called on my return up the coast, and find he has had two eggs with tea and toast, since which he feels very full and uncomfortable about the stomach, with nausea and restlessness.

5 P. M. Have just been called to him. Soon after I left he vomited the eggs, &c. and about two o'clock was seized with fever, which was soon followed by copious perspiration. His pulse is now 84, and full, and he is still perspiring freely. He feels very full and uncomfortable about the hypogastrium ; urine and eyes more tinged with bile since the fever returned. To have a purgative glyster now ; three of the pills of bebeerine with calomel at bedtime, and three again to-morrow morning.

20th. Took the pills as directed, (thirty-six grains of bebeerine last twenty-four hours.) No ringing of ears nor deafness, nor any peculiar feeling about the head ; pulse 80, and soft ; skin moist ; passed a tolerable night, but the enema did not act, and he still complains of the fulness in the hypogastrium. To have Epsom

salts now, as he prefers that purgative. Three pills of bebeerine with calomel in the evening, and three to-morrow morning.

22d. Took the medicines as directed, and another dose of Epsom salts this morning; eyes and urine less tinged with bile; pulse and skin natural; gums slightly affected by the calomel; feels hungry; and has had no return of fever since the 17th, with exception of the slight attack after the error in diet on afternoon of 19th.

23d. Continues convalescent.

29th. Resumed his duties in the sugar works, where he is not exposed to the sun or weather.

May 9th. Mr C. returned to his duties in the field a few days ago, and got well drenched with rain, which, he says, gave him a cold in the head. At noon on the 7th he was seized with ague and fever, and again at the same hours yesterday and to-day. The fever did not last more than from two to three hours on each occasion. Tongue is slightly furred.

R. Mass. pil. Coloc. comp. gr. xvi.; Calomel. gr. x. M. ft. pil. No. iv. h. s. s., and Epsom salts to-morrow morning.

10th. The pills and salts have acted well, and brought away dark-coloured stools. The fever returned at noon as usual, being the fourth daily paroxysm.

R. Sulph. Bebeer. ℥ii.; Muc. Ac. Ar. q. s. M. ft. mass. in pil. No. xii. dividenda. Three to be taken at bed-time, three at six, and three at ten A. M. to-morrow.

11th. Took the nine pills as directed; still the fever returned at noon as usual, being the fifth daily paroxysm. To have the three remaining pills of bebeerine early to-morrow morning.

13th. Has had no fever yesterday or to-day.

June 1st. Continues well.

CASE VI.—Doctor F. in December last had symptomatic fever from abscess, for which he was advised to take full doses of quinine during the remissions. This he did on three several days, but on each occasion, in two hours after taking the quinine, his whole body became covered with nettle-rash, which generally lasted for six hours at a time, and caused great irritation and annoyance. In January he was again recommended to take full doses of quinine, (ten grain doses,) and thinking that on the former occasion the nettle-rash might have arisen from some impurity in the quinine, which bore to have been made at Philadelphia, he had recourse to French quinine by different makers, but the nettle-rash invariably appeared after each dose, though one of them was as low as six grains. Altogether this occurred six or seven several times.

On the 4th of February, having again occasion for a similar remedy, he determined to substitute the sulphate of bebeerine, of which he took ten grains rubbed up with brown sugar. The bebeerine was not followed by urticaria, though it was followed by the same remedial effects as he had usually experienced from the quinine on former occasions. Since then he has had occasion to

take the bebeerine, at intervals, three several times, making four times altogether, and it has always been followed by the same remedial effects, without the slightest tendency to produce the urticaria. On one occasion he took fourteen grains at a single dose, without any perceptible effects on the ears or head, or any of that nervous feeling which commonly follows full doses of quinine.

Remarks.—Quinine in full doses is occasionally followed by rather unpleasant symptoms. When under its influence, the head becomes confused and feels larger than usual, with ringing of the ears and deafness. The whole nervous system appears to become affected, and sometimes the hands are so unsteady that the patient can scarcely write. These symptoms, in a greater or less degree, generally follow the exhibition in twenty-four hours of from twenty to thirty grains of the quinine, and it is seldom that a smaller quantity will suffice to check an intermittent when once it is fully formed. Quinine likewise acts powerfully on the skin and gall-ducts, causing an increased flow of perspiration and bile, and a very small overdose will now and then produce alarming cold sweats, sinking of the pulse, and great irritability of stomach. In all the cases of this kind which I have seen, the patient had taken the quinine by guess, instead of weighing the doses, so that it is impossible to say exactly how many grains had been taken to cause these symptoms, but I should think in each case probably not more than forty to forty-five grains in the twenty-four hours. On the other hand, in the yellow fever of this country, the late Dr Smith, Physician to the Seaman's Hospital, and several other practitioners, have been in the habit of giving, and with great success, twenty to twenty-four grain doses of quinine combined with calomel every four hours until the symptoms abated, without such doses having been followed by any alarming symptoms, and even the ears did not become affected until the fever had yielded. The fact is, quinine appears to act much after a law similar to that pointed out by Marshall Hall with regard to blood-letting;—the more in need the patient is of quinine, the greater quantity will he bear without affecting his nervous system, and the less he requires it, the smaller quantity affects him. Six or eight grains, taken to prevent an accession of fever, before a regular paroxysm has appeared, will generally cause ringing of the ears; while three times that quantity will be required to produce a similar effect after a paroxysm has once taken place. This, however, by the way.

Should the bebeerine be found equally efficacious with the quinine, in checking fever, and as an antidote to malarious diseases in general, which, I think, we already have good reason to anticipate, how far superior will it prove, in that it leaves the head and nervous system comparatively free and unaffected, while in no case within my knowledge has it ever caused irritation of stomach or cold sweat. In Mr C.'s case, No. V., where ninety-six grains of the bebeerine were taken in three days and a half, I should not have ventured to give the same quantity of quinine in the

same period for fear of cold sweats, sinking pulse, and irritability of stomach, more especially, as, when the system is charged with bile, those untoward symptoms are more apt to follow the free exhibition of the quinine.

I have a suspicion that the bebeerine is somewhat tardier, however, in developing its febrifuge effects, as witness case No. I. where the fever returned once after the system, with quinine, would have been under its effect; and again, in Case V. the fever likewise returned once after the system should have been under its influence, though both of these might certainly have arisen from the indiscretion of the patients, the first by exposing himself prematurely, and the other from an error in diet. This, however, does not apply to a similar recurrence of the quotidian in No. V's case in May.

Should further experience confirm this suspicion of a somewhat tardier action, may it not be accounted for by the quinine acting more immediately on the nervous system, and the bebeerine through the blood; and may the bebeerine, therefore, not be likely to produce a more permanent febrifuge effect? Arsenic, we know, takes eight to ten or twelve days to arrest an ague, but it is far more permanent in its effects than the bark, and may we not hope something similar from the bebeerine? Time and further experience will show.—I am, &c.

P. F. WATT, M. D.

*Georgetown, Demerara,
June 4, 1844.**

In August 1843, I forwarded to Dr Nicolson, Deputy-Inspector of Hospitals at Madras, a few ounces of the sulphate, which he at my request placed at the disposal, partly of the medical officers of H. M.'s troops, and partly in the hands of those of the Company's service. I gladly embrace this opportunity of thank-

* Whilst this paper was going through the press I received, by the West India mail of February, a letter from Dr Watt, containing the following additional remarks.

"Thinking it would be better to have cases from other medical men, than always from the same, who might be supposed to be prepossessed in its favour, I gave away most of the sulphate in my possession to other medical practitioners for trial, retaining merely a portion for my personal use, as I frequently require a full dose, and I cannot take the quinine without its giving me eight to ten hours nettle-rash all over my body. Owing to this I have no new cases myself, and none of my medical friends, with the exception of Dr M'Farlane, (son of the Principal), have, I believe, yet tried it. Dr M'Farlane gave it to several children, in whom he thought it did good as a tonic. He afterwards took the remainder of it himself in an attack of intermittent; but the fever returned notwithstanding. He is not certain, however, that the quantity he took was sufficient. So this case tells neither way. It did not affect his head in any way, and acted gently on his bowels as a laxative. This effect it likewise invariably has with me. If I take twelve or fifteen grains at bed-time, I am certain to have one copious bulky evacuation the following morning.

When quinine is given in sufficient quantity in the interval, a paroxysm seldom follows. This is not, however, always the case with the bebeerine,—one paroxysm does sometimes come on after its full exhibition,—but, so far as my experience yet goes, no second paroxysm. It is important that this should be fully known, otherwise disappointment is sure to ensue.

The bebeerine is tardier in cutting short an intermittent, but its effects seem more permanent. This, I think, I mentioned in my note accompanying the cases sent you on 4th June last."

ing Dr Nicolson and the other officers whose names are mentioned below, for their prompt attention to my requests regarding this matter.

"Her Majesty's 21st Fusiliers.—Fever. Six cases treated with Sulphate of Bebeerine."

Febris Intermittens Quot. James Templeton, private, aged 25; temperament sanguineous; line of life cotton-spinner; resident in India four years and three months. 20th November 1843.—Admitted at noon, having had a paroxysm of fever on the two preceding days at ten o'clock. The rigor was of short duration, followed by headach and great heat of skin, and with but little perspiration. *Habt. haust. Emeticum more solito; Pulv. Jalap Co. ʒi. c. Infus. Sennæ ʒij.; Vesp. pediluvium et Mist. Diaphor. ʒi. 2dis horis.* Spoon diet.

21st. The emetic and purgative acted freely; slept badly; is at present free from fever; pulse calm; skin soft; tongue clean; anorexia. *Capt. q. p. Sulph. Beberinæ. gr. v. in Extr. Gentian. et rept. hor. decima.*

Vesp. Very slight pyrexia at nine o'clock; no regular paroxysm; bowels are loose; tongue clean. *Habt. pilul. purg. ij. H. S.*

22d. Slept well; no fever; tongue clean; pulse regular. *Repr. pil. (ut heri) ter die.* Low diet.

Vesp. Is free from fever.

23d. No return of the paroxysm. *Cont. Med. ter die.*

24th Convalescent; bowels free. *Infus. Gentian. ʒiij. ter. die Omitt. S. Beberinæ.*

25th. Is quite well. Discharged.

Febris Remittens. James Barber, private, aged 21; temperament robust; line of life labourer; resident in India one year and two months. 24th November 1843.—Complained of febrile symptoms and soreness all over him, and says he felt suddenly unwell at the barracks; pulse of ordinary strength and frequency; skin harsh; tongue slightly furred; anorexia and thirst.

Habt. Haust. Emeticum q. p.; postea, Calomel. gr. vi.; Pulv. Jalap. Co. ʒi; Mist. Diaphor. ʒi. 2dis horis. Utatur balneo calido, et capt. pil. Calomelanos et P. Antimon. H. S. Spoon diet.

25th. Was freely purged; perspired after the bath, and slept well last night; apyrexia; pulse calm; skin soft; tongue whitish.

Capt. Sulph. Beberinæ gr. v. in Extr. Gentian. et repr. 3tis horis. Cont. Mist Diaphor. si opus sit.

26th. No return of fever yesterday; slept well; bowels free; appetite returned; pulse calm; tongue clean. *Cont. pil. ut supra ter die.* Low diet.

27th. No return of fever; bowels loose; tongue clean; slept well. *Pergat ut heri.*

28th. Convalescent; bowels free. *Infus. Gentian. more solito.* Half diet.

29th. Bowels open.

30th. Is quite well. Discharged.

Febris Remittens. James Axford, private, aged 23; temperament plethoric; line of life labourer; resident in India four years. 27th November 1843.—Complains of febrile symptoms, which attacked him the evening before last; says he slept in a current of air in the barracks; general health good; last admission in July 1842 with diarrhoea; pulse full and frequent; headach; heat of the skin, and furred tongue; bowels confined.

Fiat venesectio ad ℥xxiv. Habt. haust. emeticum q. p.; postea Cal. gr. vi.; Pulv. Jalap Co. ʒi. Spoon diet.

Vesp. Apyrexia. Capt. Sol. Tart. Antimon. ʒi. horā quāque secundā et pil. Calomel. et. P. Antimon. H.S.

28th. V. S. removed the headach; the emetic operated freely; the purgative only acted twice. Slept well, and feels greatly better; pulse 78; skin soft; tongue white, is thirsty. *Capt. Mist. Sennæ ʒiv. q. p. et habt. Pil ex Sulph. Beberinæ gr. v. in Extr. Gentian. 4tis horā, et cont. Sol. Tartar. Antimon. si opus sit.*

29th. Continues free from fever; bowels are loose; pulse calm; skin soft; tongue clean; appetite improved. *Cont. Med. ut heri. Low diet.*

30th. Is quite well. *Cont. med. Discharged.*

Febris Intermitt. John Jerrold, private, aged 23; temperament sanguineous; line of life labourer; resident in India three years and three months.

Vesp. 29th November 1843.—Complains of having been seized at 3 P. M. with alternate fits of cold (with shivering) and heat, lasting for nearly three hours. Cannot assign any cause for the attack. Pulse regular; skin soft; tongue white; had a similar attack last month.

Habt. Haust. Emeticum q. p.; post., Calomel. gr. vi. c. Pulv. Jalap. Co. ʒi. Utatur pediluvio et Pil. Calomel. c. P. Antimon. H. S.

30th. The emetic and purgative operated freely; slept well, and is at present free from fever; pulse 76; skin soft; tongue cleaning. *Sumat q. p. Sulph. Beberinæ gr. v. et repr. 4tis horis. Capt. Mist. Diaphor. si opus sit. Spoon diet.*

December 1st. No paroxysm yesterday. Bowels free; slept well. *Cont. Med. ut heri.*

2d. No return of the paroxysm. Bowels acted freely; slept well; tongue clean; pulse regular; skin moist; appetite returned. *Cont. Sulph. Beberinæ ut heri. Low diet.*

3d. Continues free from fever. Bowels loose; tongue clean; appetite good.

Omitt. Sulph. Beberinæ et capt. Infus. Gentian. ʒiij. ter die.

4th. Continues to improve. No fever; bowels free; tongue clean; appetite good. *Cont. remedia ut supra.*

5th. Improving. No fever; bowels free. *Idem.*

6th. *Idem.* Half diet.

7th. Discharged.

Febris Intermittens Quot. James M'Chrink, private, aged 28; temperament phlegmatic; line of life, ship smith; resident in In-

dia three years and three months. 22d November 1843.—Admitted at 6 P. M., of a pale cachectic appearance, having had severe rigors, followed by acute febrile symptoms, about 10 A. M. the same day. He stated that he had been subject to severe attacks of ague during the previous sixteen months. The febrile symptoms were reduced by an emetic, purgative, and leeches to the temples. Subsequently fifteen grains of the sulphate of bebeerine were given daily in pill until the 25th November, when the occurrence of hepatitis prevented its employment for three days. On the 28th November the fever returned, but without the cold stage, and again on the 29th. His mouth was affected by the remedies employed in the hepatitis, and the bebeerine was continued until the 8th December, when he was discharged to duty. Fever has not since recurred.

Febris Con. Com. Joshua Richards, private, aged 24; temperament sanguineous; line of life shoemaker; resident in India four years. 29th November 1843.—Admitted at 6 A. M.; stated that he had been seized with rigors the preceding evening, succeeded by headach, much heat of skin, and thirst. On the subsidence of these symptoms 10 grains of the sulphate of bebeerine were given daily for a week. The disease having returned with severity on the evening of the 11th December, attended with much determination to the head and relaxed bowels, and again on the following day, fifteen grains were now given daily during the pyrexia, and he continued free from fever for upwards of ten days. On his return to his duty he was again attacked with the disease, and as all the bebeerine had been expended, quinine was employed.

In the above cases the medicine did not produce *tinnitus aurium* or deafness.

Kamplee, 19th January 1844.

J. DEMPSTER, M.D. Surgeon,
H. M. 21st Fusiliers.

The following are the reports from the medical officers of the H. E. I. C.'s Service.

To the Superintending Surgeon Ceded Districts.

Sir,—In reference to memorandum No. 369, dated Medical Board Office, 2d May 1844, I have the honour to inform you, that, from not having had any well-marked cases of periodic fevers in hospital during the time alluded to, I was unable to make fair trial of the effects of the sulphate of bebeerine,

On two or three out-patients, however, its febrifuge power did not appear satisfactory, whilst its unpleasant taste and astringency were complained of.—I have, &c., &c.

(Signed) J. GODFREY, Garrison Surgeon,
Bellary, 9th May 1844.

To the Secretary to the Medical Board Madras.

Sir,—Having expended the small supply of sulphate of bebeerine sent to me for trial in fever of miasmatic origin, I have much

satisfaction in forwarding a brief statement of the various cases in which it was employed.

It will be observed that, though given when fever was present, it only in one instance affected the brain, and that transiently; that it has a decided tendency to induce perspiration, allaying fever and checking exacerbations; and that it seems to exert a peculiar power over the alvine secretions, changing them to a brick-red colour. This appearance of the evacuations, however, being far from uncommon in remittent fevers, cannot be regarded as solely owing to the influence of bebeerine, if indeed at all.

Notwithstanding my limited experience, I cannot but believe that bebeerine is a medicine of the highest efficacy in checking fever, and that it will prove a valuable substitute for quinine.—I have, &c., &c.

(Signed) J. DORWARD, Assist. Surgeon 13 Reg. N. I.
Chicacole, 13th May 1844.

Febris Remittens. Veerasaamy, aged 24, Sepoy, C. Company, thin spare habit. 12th December 1843. Admitted at 6 A. M.; complains of having had fever for two days, with frequent chills, giddiness, and prostration of strength; skin hot; pulse quick; eyes suffuse; tongue red.

Hab. stat. pulv. Ipecac. ℥j.; *Ant. Potass-tart.* gr. i. *M. ft. pulv.*; *postea Pulv. jalap.* Co. ʒj.

R. Calomelanos, Pulv. antimon. co. āā. gr. iiss. *M. ft. pil. qq. horā tertiā.*

13th, 7 A. M. Slight remission of fever was experienced yesterday after the action of the medicine, but an exacerbation came on at night with delirium preceded by rigors; skin warm and dry; pulse quick; great thirst; no pain; head at present clear.

Pulv. jalap. et. Pil. Calamelanos rept. ut heri.

R. Liqr. Ammon. acet. ʒj.; *Ant. potassio-tartrat.* gr. ij.; *Misturæ camphoræ* ʒiij. *ft. mist. Capiat ʒj. quāque horā tertiā.*

14th, 7 A. M. Occasional chills; fever and low delirium all night. Was violently purged yesterday by the medicine; head symptoms and fever now remitting partially.

R. Quinina Disulph gr. ij. *omni horā sumend.*

16th, 7 A. M. A better night; no delirium; dry warm skin continues, with occasional rigors; considerable debility. *Cont. Quina disulph.*

16th, 7 A. M. Had a severe accession of fever last night with delirium, and still mutters when left alone. Complains of chilliness. Skin dry and warm; lips parched; tongue dry; bowels free.

Emplast. venicat. occipit appl.; hab. Stat. Bebeerinae grs. x. *et merid. rept.*

17th, 7 A. M. Fever less. Three hours after taking the first dose of bebeerine, which seemed to affect his head a good deal, an accession of fever took place, and the second dose was not given. The blister rose well, he passed a better night, and looks more lively. *Hab. st. Bebeerinae* grs. x. *et. merid. rept.*

18th. No accession of fever since last report. Skin continues warm and dry with a feeling of chilliness; took both doses of bebeerine yesterday, which induced perspiration. No delirium. *Cont. Bebeerina ut heri.*

19th, 7 A. M. Skin for the first time soft and cool. Had a copious brick-red feculent motion in the night. *Cont. Bebeerina ut heri.*

20th. Free from fever. *Cont. Bebeerina dos. grs. v. bis die.*

21st. Complains only of debility. *Omitt. Bebeerina.*

27th. Well. Discharged.

Febris Remittens.—Soobroyah, aged 34, Sepoy, F Company, No. 322, weak and emaciated. Admitted 29th December 1843, at 7 A. M., complaining of fever for the last two days, with exacerbations about noon, and constant giddiness. Skin warm and dry; pulse frequent; tongue foul. Was in hospital from the 16th November to the 19th instant, labouring under *febris continua*, and has never properly regained his strength. *Hab. stat. Pulv. Ipecac. ℥j.; Pulv. Jalap. co. ʒj.*

Vesp. Had an accession of fever with rigors at 1 P. M. Complains of chilliness; skin hot and dry; bowels freely opened; stools dark-brown. *Hab. Calomelanos, Pulv. Antim. Co. āā gr. iij. ʒi. pil. h.s.*

30th. Passed a restless night, the feeling of chilliness continues, and the skin dry and warmer than natural. *Hab. stat. Bebeerinae, grs. v. et merid. rept.*

31st. Perspired profusely after the bebeerine; an exacerbation of fever with considerable giddiness came on at 2 P. M.; passed a better night, however; fever still present. Bebeerine continued *ut heri.*

Jan. 1st. Fever left him in the night; skin cool, feels chilly; has had several brick-red looking stools. Bebeerine continued.

2d. Had a paroxysm of fever ushered in by rigors from three to six A. M. this morning. Bebeerine continued.

3d No fever nor chilliness. Bebeerine continued.

4th. Continues free from fever, feels stronger and better. Bebeerine continued.

6th. Convalescent. Omit bebeerine.

11th. Well. Discharged.

Febris Intermit. Quotid.—Rammanah, aged 50, Sepoy, B Company, No. 284, 41st regiment Native Infantry.

23d March 1844. Admitted at 7 A. M., complaining of attacks of fever, preceded by rigors yesterday and the day before, from noon until night; pulse quick; skin dry; tongue furred. *Hab. st. Pulv. Ipecac, ℥j.; Antimon. Potass-tart gr. j.; postea, Pulv Jalap. Co. ʒj.*

24th. Medicine acted well; fever returned in the evening, took a pill containing *Calomel. grs. iiss.; Pulv. Antimon. Co. grs. iiss.* Passed a feverish, restless night; skin moist, but warmer than natural; thirst.

Hab. Pulv. Jalap Co. ʒj.; St. Mist. Salin. Co. ʒj. q. q. 2dd horā.

25th. Exacerbation of fever last night; no rigors; complains of a burning sensation all over his body; pulse frequent; skin dry.

Rept. Pulv. Jalap. Co. Cont. Mist Salina.

26th. Has had fever all night ; slight remission ; bowels free.
Habl. Bebeerinæ grs. v. ; quæque horâ tertid.

27th. Free from fever ; took twenty grains of bebeerine yesterday.

28th. No fever. Continue bebeerine.

29th. No fever, weak. Omit bebeerine.

April 5th. Discharged.

Chicacole, (Signed) J. DORWARD, Assist.-Surgeon,
13th May 1844. 13th Regiment, Native Infantry.

Five cases of intermittent fever treated by the sulphate of bebeerine, in the hospital, 3d Battalion of Artillery at Kamptee.

Febris Inter. Quotid.—T. G. Doyle, gunner, aged 30, ten years resident in India ; nervous temperament. Admitted at six o'clock A. M. on the 26th November 1843, a man of spare habit, temperate. Returned this morning from Nagpore, where he has been on duty during the last fourteen days. By his account he has had daily paroxysms of fever for the last nine days. They began at nine in the morning, and terminated at three or four o'clock in the afternoon. There was no cold stage ; the symptoms are said to have been headach, heat of skin, thirst, nausea, &c., followed by profuse perspiration, bowels lax, tongue furred. At present skin is cool and pulse natural, but he complains of headach, which does not leave him during the intermission.

Has taken no medicine since he was first attacked. *Olei Ricini* ʒi. *Aquæ, ʒiss. M. ft. haust. statim sumend.* Spoon diet.

Five o'clock P. M.—Fever returned at nine o'clock, and is still present ; complaints of the headach being severe, of nausea and thirst ; skin hot and dry ; pulse 104, full and soft ; four stools, consisting of orange-coloured mucus and some loose feculent matter. Owing to the return of the fever, the leeches, although they operated well, did not relieve the pain of head. Has taken an ounce of the following mixture, at intervals, since the return of the fever.

R. Antimon. potassio-tart., gr. i. ; Magnesiæ Sulphatis ʒss. ; Aquæ Acet. Ammon. ʒij. ; Misturæ camphoræ, ʒviij. M. fiat mistura.

R. Calomelanos ; Pulv. Ipecac. comp. aa gr. vi. ; Confect. aromat. q. s. ft. pil. horâ somni sumend.

27th. At ten o'clock P. M. the paroxysm terminated in profuse perspiration, and since that time the headach has been gradually diminishing in severity. Skin is now cool ; pulse 76 ; three stools, they consist of brownish mucus and slime ; has no abdominal uneasiness.

Had three grains of the sulphate of bebeerine dissolved in an ounce of water at four o'clock, and the same was repeated at five, six, seven, eight, and nine o'clock.

Vespere. Took all the bebeerine ordered, (eighteen grains,) and the fever has not returned ; skin has been cool, and pulse natural ; headach has not entirely left. The only sensible effect from the bebeerine was its impression on the palate. He describes its taste as a mixture of sweet and bitter. Four stools, a greenish mucus.

R. Massæ pil. Hydrarg. gr. vj.; Pil. Rhei comp. gr. x. M. ft. pilulæ, iij. h. s. s.

28th. Continues free from fever; one stool, a small quantity of natural fæces; headach is now very alight; tongue furred in the centre. Nil.

Vesp. No return of fever, still has slight headach. Three loose natural stools. *Rept. pilulæ h. s. ut heri.*

29th. No headach; tongue clean; two feculent stools; appetite returns. Four ounces of bread extra.

30th. Continues well.

1st December. Chicken diet.

2d. Discharged from hospital.

Febris Inter. Tertiana. Patrick Fitzpatrick, gunner, aged 30, thirteen years resident in India; sanguine temperament; a muscular man of the ordinary height; temperate. Admitted at eleven o'clock A. M., on the 28th November 1843, in the cold stage of an intermittent, which he says attacked him on the 26th instant at same hour. Soon after admission his skin became hot and pulse frequent. He complained of headach, nausea, and loss of appetite, aching pain in the legs, thirst, giddiness, and prostration of strength; was ordered on admission one grain of tartar emetic and a scruple of ipecacuan, which caused a free emetic effect; and he afterwards took, as his bowels were confined, six grains of calomel and two scruples of compound jalap powder, by which he has been moved four times; stools are loose but not otherwise unnatural; fever is leaving him; he begins to perspire. Nil. Spoon diet.

29th. Complains only of headach, and it is not severe; tongue is very little furred, moist; pulse and skin natural; two stools. Nil.

30th. Since last report free from fever, but he expects its return to-day; no stool during the last twenty-four hours. *Hæust. purgant. ʒiv.*

6 P. M. At half-past nine o'clock this morning felt cold and chilly; nails blue. After ten o'clock the skin became hot and dry; he was restless; complained of thirst, nausea, and giddiness; pulse frequent. As the draught taken in the morning purged him repeatedly, no other medicine was ordered. At two o'clock he perspired copiously, and he now complains only of giddiness and debility; skin cool, and pulse of natural frequency.

R. Massæ pil. Hydrarg.; Pulv. Antimon. comp. a a. gr. v. M. fiat pilulæ iij. h. s. s.

1st December. Remains without fever; no stool during the night.

R. Antim. Potassio-tartrat. gr. j.; Magnes. Sulphat. ʒss.; Mist. Camphoræ ʒvj. M. ft. Mist. ʒiss. ter in die.

2d. Took at four o'clock A. M. three grains of sulphate of bebeerine dissolved in an ounce of water. The same was repeated at five, six, seven, eight, and nine o'clock.

Vespere. Fever has not returned. Nil.

3d. Continues free from fever, but bowels have not been moved since the first. *Pulv. Jalap. C. ʒj. stat. sumend.*

4th. No fever; appetite improves; two stools. Chicken diet.

5th. Continues well; discharged to duty.

Febris Inter. Tertiaria. Charles Lowther, bombardier, aged 29, six years and three months resident in India; sanguine temperament; muscular; of sober habits. Admitted into hospital on the 31st March 1844, at four o'clock P. M. in the hot stage of a paroxysm of intermittent fever; complains of headach, thirst, loss of appetite, and debility; pulse 108, full; tongue white; bowels confined. By account had on the 27th and 29th of the present month attacks of fever; each began at two in the afternoon with rigor, and terminated in profuse perspiration at five o'clock in the evening. Took on admission one grain of tartar emetic and a scruple of powdered ipecacuan, and soon after four grains of calomel and fifty of compound jalap powder.

1st April. After the operation of the emetic there was profuse perspiration, followed by relief of all the symptoms; two stools after the purgative; is cool this morning and free from uneasiness; pulse natural. Nil.

2d. Since last report no fever; but this morning complains of headach; no stool since the evening of admission. *Haust. purgant.* ʒiv.

5 P. M. Immediately after the morning visit the fever returned, commencing with rigor; headach is very severe; several copious but not unnatural stools.

R. Antimon. pot-tart. gr. j.; Aquæ ʒvj., solve; sumat ʒiss, om. horâ ad Stiam vicem; Temporib. admov. hirud xvj.

3d. At half past six o'clock the fever terminated in profuse perspiration; headach removed by the leeching. He passed a very good night, and this morning is cool and without uneasiness; tongue clean; bowels open. Nil.

Vesp. This afternoon headach, without heat of surface or other marked febrile symptoms; bowels not moved to-day.

R. Calomelanos, gr. iv.; Estr. Colocynth. C. gr. vj. M. ft. pilulæ ij. h. s. s.; Temporibus admovr. hirud. xij.

4th. Continues without fever; no headach since the operation of the leeches; one natural stool; took three grains of sulphate of bebeerine dissolved in an ounce of water at five, six, seven, eight, nine, and ten o'clock.

6 P. M. After the bebeerine (eighteen grains) fever returned at eleven o'clock. The rigor was slight, and he began to perspire at three o'clock; skin now cool and moist, and he complains only of headach; bowels not moved. The fever was less than on any previous occasion. *Rept. hirud. xij. temporib. applic.; rept. pilulæ h. s. s.*

5th. Headach again removed by the leeches; complains only of debility; tongue a little furred; several stools containing a little slime. Nil.

6th. No fever yesterday ; one stool, a small quantity of slime ; pulse 84. The bebeerine was repeated as on the 4th at four, five, six, seven, eight, nine, ten, and eleven o'clock.

Olei Ricini ʒj. *meridie*.

7th. Escaped fever yesterday after taking twenty-four grains of the bebeerine, which neither affected the head nor the pulse ; pulse 80, soft ; bowels open. Nil.

8th. Remains without fever. Nil.

9th. Feels well and wishes to return to duty ; appetite keen ; bowels open.

11th. Well. Discharged.

Febris Inter. Quotidian.—Daniel Murphy, gunner, aged 30 ; five years resident in India ; sanguine temperament ; sober ; of robust health. Admitted at six o'clock A. M. on the 13th May 1844, when he complained of loss of appetite, slight headach, giddiness, thirst and debility, tongue furred, moist, skin cool, pulse natural, bowels by account regular.

States that he had on the 10th, 11th, and 12th paroxysms of intermittent fever, commencing each day at three o'clock in the afternoon, with rigor followed by heat of skin and headach, and terminating in perspiration about six o'clock in the evening ; can assign no cause for the attack.

R. *Antimon. Potassio-tart.* gr. i. ; *Pulv. Ipecac. rad. contrit.* ʒi. *M. fiat pulv. statim sumend.*

Vespere. Emetic acted well ; paroxysm returned to-day at ten o'clock. There was no rigor, but his face became flushed ; headach increased in severity, and he complains of pain in the back and lower extremities, of thirst, nausea, and great prostration of strength ; skin hot and dry ; pulse 104, full ; took frequently one ounce and a half of the following mixture ; it nauseated him, but has not moved his bowels.

R. *Mist. camphor.* ʒix. ; *Antimon. Folassio-tart.* gr. iss. ; *Magnes. Sulph.* ʒvi. *M. ft. Mist.*

R. *Calomelanos*, gr. vj. ; *Pulv. Jalapæ Co.* ʒ ij. *M. ft. pulv. statim sumend.*

14th. The sweating stage commenced at six o'clock P. M. He is this morning cool, feels very little headach ; pulse 78, soft ; bowels were freely moved with the assistance of a purgative enema. Took three grains of sulphate of bebeerine dissolved in an ounce of water at four, five, six, seven, eight, nine, and ten o'clock.

Vesp. Took the twenty-one grains of bebeerine ; it produced no sensible effect either on the pulse or head. Fever returned at three o'clock P. M., but was slight. He is now perspiring ; bowels again moved ; stools feculent. He perspired freely while taking the bebeerine, but that is attributable to the weather, which is intensely warm.

R. *Massæ pil. Hydrarg.* gr. vj. ; *Ipecac. rad. contrit.* gr. ii. *M. ft. pilulæ* ij. *h. s. s.*

15th. An excellent night ; pulse 78 ; skin cool and moist. Bebeerine repeated as yesterday.

6 P. M. The fever returned at noon. There was more headach than during the previous paroxysms in the hot stage; his pulse was 100; face flushed; conjunctiva injected; perspiration commences; one not unnatural stool. *Rept. pilulæ h. s. ut heri.*

16th. Fever terminated as before in copious perspiration; pulse 84; tongue coated with a white fur, moist; one stool.

Three grains of sulphate of quinine were dissolved in an ounce of water, and given at the same hours as the bebeerine.

6 P. M. Took twenty-one grains of the quinine. There has been no return of fever; weak, but has no particular uneasiness; two natural stools. Nil.

17th. A good night; pulse 80; no symptom of fever.

18th. Convalescence; regains his appetite; bowels open. Four ounces of bread extra.

20th. Continues well; has an excellent appetite; bowels regular. Chicken diet.

23d. Half diet.

24th. Well. Discharged.

Febris Inter. Tertianæ.—Mrs Ann Dogherty, aged 28, five years resident in India; of spare habit. Admitted into hospital at 6 o'clock P. M. on the 10th May 1844 in the hot stage of a paroxysm of intermittent fever, which she states commenced with rigor about an hour before admission. She complains of severe headach, pain in the back and lower extremities, of thirst, nausea, and loss of appetite. Skin is hot and dry; pulse 106, full, but compressible; tongue coated with a thick fur, but moist; bowels confined.

By her account had attacks of fever on the 6th and 8th. They commenced at 4 o'clock P. M. and continued for several hours. No cause for the seizure can be assigned.

R. *Antim. Potassio-tart. gr. i.; Ipecac. rad. contrit. ʒi. M. ft. pulv. statim sumend.*

R. *Calomelanos gr. v.; Pulv. Jalapæ comp. ʒi. M. fiat pulv. post horas tres sumendus.*

11th. Emetic brought on the sweating stage, she ejected a quantity of greenish fluid; purge has acted several times; headach, thirst, and debility are what she now complains of; skin cool; pulse 84, soft; tongue clean.

R. *Antimon. Potassio-tartrat. gr. i; Magnes. Sulph. ʒi; Aqua ʒviij. M. ft. mistura cujus sumat ʒiiss. ter in die.*

12th. Had no fever yesterday; feels weak and giddy in the erect posture, but in other respects is well; bowels open. 6 P. M. Paroxysm returned at one o'clock, rigor followed by heat and sweating, the latter commencing about half an hour ago. The attack was attended by severe headach and acceleration of the pulse, flushing of the face and urgent thirst; the headach remains. Has taken several doses of the saline mixture, which has produced both an emetic and purgative effect. Stools watery, but contain some healthy feculent matter. *Temporibus admovr. hirud. xvj.*

13th. Headach relieved by leeches; it is not complained of this morning; is weak and scarcely able to stand from giddiness.

14th. Fever expected to-day; one stool yesterday; pulse 64; three grains of sulphate of bebeerine dissolved in an ounce of water were given at 5, 6, 7, 8, 9, 10, and 11 o'clock. 6 p. m. Took twenty-one grains of the bebeerine, the last dose at 11 o'clock, but fever returned at noon. There was no cold stage, the skin suddenly became hot and dry. She complained of headach and thirst, and was restless, bowels not having been moved in the morning, she took during the attack an ounce of castor-oil. Thinks the present attack the mildest; the headach remains. Began to perspire at 5 o'clock; pulse 98; oil has not yet acted.

Rept. hirudines xiv. tempor. applic.

R. Massæ pil. Hydrarg. gr. vi.; Pulv. Ipecac. gr. ij. M. fiat pilulæ ij. h. s. s.

15th. Headach removed by the leeches; complains only of debility; several brown feculent stools.

Rept. pilulæ h. s. ut heri.

16th. This is the fever day; weak, and does not regain her appetite; bowels open; three grains of the sulphate of quinine were dissolved in an ounce of water and given at the same hours as the bebeerine. 6 p. m. Had a slight attack of fever; it commenced at four and left at five o'clock; tongue still furred but moist; slight deafness from the quinine, but no headach; pulse 96.

Rept. pilulæ c. Pulv. Antimon. c. gr. iv.

17th. Tongue remains furred; thirst; skin cool; no stool since yesterday morning. *Olei. Ricini 3j.*

18th. Oil operated several times; tongue cleans; quinine repeated as before.

19th. Not the slightest symptom of fever yesterday; weak, but appetite returns. Bowels open.

20th. No return of fever; gains strength.

21st. Chicken diet.

24th. Well. Discharged.

Remarks.—These five cases being ascertained by observation in hospital to be regular uncomplicated intermittent fevers, they were considered favourable for testing the antiperiodic virtue of the sulphate of bebeerine. After the functions of the stomach and bowels had been regulated by an emetic, mild mercurial and aperient medicine, the time of the paroxysm being known, the sulphate of bebeerine was ordered in three grain doses hourly, till from eighteen to twenty-four grains were taken. It was managed so that the last dose was taken immediately before the expected return of the fever. In the two cases that the bebeerine did not prevent the paroxysm, the sulphate of quinine was substituted for the bebeerine, for the purpose of contrasting the effects of the two remedies.

In the cases of Doyle and Fitzpatrick eighteen grains of the sulphate of bebeerine prevented the return of the fever. In that of Lowther, although the same quantity did not have a similar effect, the paroxysm that followed was later in appearing and milder than those that preceded it, and on the next expected recurrence of the fever twenty-four grains were given with perfect success. In these

three cases the antiperiodic power of the bebeerine was fully equal to what I should have expected from the sulphate of quinine similarly administered.

In the case of Murphy twenty-one grains of the bebeerine were insufficient to prevent the coming paroxysm, which, however, was slight and postponed. The same quantity of bebeerine was repeated before the next paroxysm, but contrary to expectation it returned at an earlier hour, and was more severe than the previous one. Quinine was then substituted for the bebeerine, and twenty-one grains similarly administered were followed by recovery.

To the woman Dogherty twenty-one grains of the sulphate of bebeerine were given, without any marked influence on the fever, while the same quantity of quinine, subsequently given, had to be repeated before it prevented the return of the fever.

From these cases I infer that the sulphate of bebeerine possesses considerable antiperiodic power, and although inferior to, it is likely to be a valuable substitute for the sulphate of quinine. The bebeerine neither excited the circulation nor affected the head.

(Signed) J. ANDERSON, M. D. Assist. Surgeon.

(Signed) D. FALCONER, Actg. Supg. Surgeon.
N. S. Force.

Kamptee, 24th May 1844.

The following case, in which bebeerine was tried in a case where the constitution had long suffered from intermittent, was kindly furnished me by my friend Dr Bennett.

Bronchitis ; intermittent fever of thirty-two years' duration ; regular quarlan ; enlargement and induration of spleen ; treated by sulphate of Bebeerine.—Alexander Murray, aged 56, admitted November 21st, complaining of dyspnœa and cough, attended with expectoration. On percussion the chest is resonant on both sides. The respiratory murmurs are indistinctly heard over anterior part of chest. Over the sides and back a slight sonorous râle may be heard at the termination of the expiration. The expectoration is copious, composed of muco-purulent matter, loosely connected together in masses. Complaints of dyspnœa, which sometimes amounts to orthopnœa. Can only sleep with his shoulders elevated. The dyspnœa comes on in paroxysms, and is induced by exertion, and by an east wind.

The cardiac dulness measures two and a-half inches across. The sounds of the heart are heard most distinctly about two inches below the left nipple. In this situation he complains of pain, which is increased on exertion. A slight rough murmur accompanies the second sound of the heart. Pulse 52, and of good strength.

While percussing in the cardiac region, an intense degree of dulness and sense of resistance were perceptible immediately under the false ribs, external and inferior to the cardiac region. This extended for about four and a-half inches from above downwards, and about three inches from before backwards. On inquiring whether he has ever suffered from ague, it appears that he laboured under that dis-

case thirty-two years ago, when a soldier in the Peninsula. It attacked him in Madrid, when it was present seven months continuously. Since then he has scarcely ever been free from it.

Complains of pain in the head, *muscæ volitantes*, occasional vertigo, and pains between the shoulders. Tongue furred; appetite good; thirst; bowels have been opened five times yesterday by medicine. His countenance and general aspect present the peculiar dull and haggard character indicative of long suffering from ague. There is no cedema of the lips.

R. *Antim. Tart.* gr. j.; *Spt. Eth. Nitr.* ʒiss.; *Mist. Scilla* ʒvss.; *Sol. Mur. Morph.* ʒij. *M. Sumat* ʒj. *quarta quæque hora.*

Nov. 22d. Passed a sleepless night, owing to frequent paroxysms of dyspnœa and cough; sputa slightly tinged with blood; mucous râles heard all over chest; complains of great pain of head and vertigo. *Appl. cuc. cruent. et extrahatur sanguis ad ʒxii. pectore dextro.*

25th. Has been much relieved since cupping; the respiration has been more easy; sputa still tinged with blood.

Dec. 3d. Bronchitic symptoms have now nearly disappeared. Last night had an attack of intermittent fever. Says it returns every third night.

Dec. 5th. R. *Sulph. Quinæ* ʒj.; *Pulv. Capsici*, gr. ix. *M. dividantur in chart. iij.*; *cujus capiat unam statim, et repetatur quæque quarta hora.*

6th. Took the three powders yesterday before the attack, which was less severe than on former occasions.

8th. Repeat the powders.

9th. The attack last night, notwithstanding the powders of quinine, was much more severe than that of the 6th. There is considerable pain of head and suffusion of the eyes induced by the powders.

12th. Last night had another attack, which was very severe. The quinine powders were purposely omitted, in order that the duration and severity of the attack might be observed. The cold stage and shivering continued three-quarters of an hour, and the sweating was very profuse, and continued for two or three hours.

R. *Bebeerin. Sulph.* gr. v.; *Pulv. Capsici*, gr. iij. *M. ft. pulv. Mitte tales vj.*; *Sumat unum ter in die.*

15th. The attack came on last night, and was of the same length as that noticed at last report. The shivering was not so severe, nor was the sweating so profuse.

23d. R. *Bebeerin. Sulph.* ʒj.; *Pulv. Capsici*, gr. ix. *M. ft. pulv. tales iii. Capiat unum quæque quarta hora.*

24th. In the attack of last night the cold stage was of twenty-five minutes' duration.

27th. Is ordered to take the bebeerine powders, containing five grains each, three times a-day during the interval, and three powders, each containing a scruple, on the day previous to the attack. Last night the cold stage was of twenty minutes' duration, and was much less severe. Considerable cephalalgia.

30th. Last night the cold stage was of sixteen minutes' duration, and the sweating stage was very slight. Still cephalalgia.

Jan. 2d. Last night the cold stage lasted fifteen minutes, and was of much less severity than formerly; cephalalgia more severe; considerable suffusion of the eyes and vertigo.

R. *Pil. Col. co. ij. h. s. sumend.*

R. *Haust. Cath. ʒiv. cras. mane sumendum.*

5th. Last night the cold stage lasted for thirteen minutes; cephalalgia much diminished. The dose of bebeerine on the day of attack to be diminished to ten grains in each powder.

8th. The cold stage last night was of ten minutes' duration and very slight.

He was permitted to leave the hospital to obtain his pension at Glasgow. He returned on the evening of the 12th in a state of intoxication, and was so disorderly in the porter's lodge that he was sent to the police office, and has not since been heard of.

Copied from Journal of Ward No. 2., commencing Nov. 7. 1844.

M. YOUNG, Clerk.

Remarks.—This man entered the hospital complaining of asthma and bronchitis. The pulmonary symptoms were successfully combated by expectorants combined with an antispasmodic, and by local depletion. It is singular that, although he laboured under a very intense form of intermittent fever, he did not complain of it. The enlargement and induration of the spleen, as determined by percussion, led to its discovery. When the bronchitis and dyspnoea had subsided, I treated the ague first by large doses of quinine, which, although they had a slight effect upon the intensity and duration of the attack on one occasion, produced none whatever on being tried a second time. On each of these occasions ʒj. of the sulphate, with nine grains of *Pulv. Capsici*, were given during the twelve hours preceding the attack. I then determined to try the sulphate of bebeerine, but previously watched an attack of the fever, when no drug whatever had been given. On this occasion the shivering was very violent, and the cold stage continued three-quarters of an hour; the hot and sweating stages were prolonged to between two and three hours. Fifteen grains of the bebeerine were given daily during the interval, in three doses, and ʒj. every third day, when the attack was expected. The first attack experienced after this treatment was adopted was of the same duration, but much diminished in severity. In the second attack, the cold stage, instead of lasting 45 minutes, continued only 25 minutes. In the third attack it continued 20; in the fourth, 16; in the fifth, 15; in the sixth, 13; and in the seventh, 8. At this time he left the hospital, and has never returned. I much regret that the spleen was not again percussed before his departure.

The action of the medicine appeared to me in every respect similar to that of quinine. The relative power of each, of course, is only to be ascertained by more extended trial. But so far as their actions as an antiperiodic and as a stimulant are concerned, they appear to me to be identical. The same congestion of the brain

was experienced in the above case after taking 3j. doses of both drugs. Indeed, from what I have observed of its therapeutic effects in this instance, I have no doubt that bebeerine possesses all the valuable properties of quinine in an equal if not a superior degree.

J. H. BENNETT, M. D.

The cases of fevers treated with bebeerine with which I am acquainted, amount to about 40, and they are all collected in the subjoined tabular statement. It will be seen on inspecting the table, (p. 383,) that bebeerine has been tried in various climates, including Edinburgh, Canada, the West and East Indies, in all the various forms of remittent and intermittent, and at all ages from twelve to seventy-four. In all of them it appears to have manifested more or less of antiperiodic action. In 6 cases, or nearly 1 in 7, it does not seem to have acted satisfactorily. Of 26 cases, the details of which are given, 5 only suffered from any unpleasant effect, and this seems not to have gone beyond a little *tinnitus aurium*. It appears therefore to be entitled to a fair trial, especially in the public services, where alone such cases can be found and properly observed, and where its cheapness, contrasted with the price of quinine, might be matter of importance.

Periodic headach and neuralgias.—Professor Simpson having made pretty extensive trial of bebeerine in Edinburgh, I begged of him to let me know what results he had obtained. These he has embodied in the following letter to me.

22, Albany Street, 30th January 1845.

My Dear Sir.—You must allow me to give you the general impressions which I have derived from observations made upon the use of the bebeerine, as I have little time to enter into particulars. You know that Piorry and others have somewhat frightened us accoucheurs from employing quinine during pregnancy, alleging, as they do, that it is apt to produce abortion or premature labour. Nor is arsenic a medicine which one would choose to exhibit to a pregnant female. Though thus deprived of the advantages to be derived from the use of these two potent remedies in periodic neuralgias, still, as you well know, such neuralgias are far from being uncommon during utero-gestation.

Latterly I have used your sulphate of bebeerine in some instances of this kind, and, as it has appeared both to me and to my patients, with the most perfect and satisfactory success. I prescribed it about a couple of months ago to a lady who had one of the most severe attacks of forehead and face neuralgia that I remember to have seen. It came on towards noon, and kept her in blindness and agony for some time. The ordinary medical attendant on the family had leeches her, &c. without relief. I advised the bebeerine to be given in two grain pills repeatedly during the interval between the paroxysms. As the medicine seemed to have no effect I gradually in-

TABULAR VIEW OF INTERMITTENT AND REMITTENT FEVERS TREATED WITH BEEBERINE.

No.	Case.	Sex.	Age.	By whom Treated.	Where.	Form of Disease.	Duration in days.	Quant. Bebeerine.	Remarks.
1	Mr C.	M.	27	Dr Douglas MacLagan	Edin.	Tertian	5	...	First dose vomited when bowels loaded.
2	...	M.	25	Do.	Do.	Do.	...	40	No unpleasant effects.
3	J. P.	M.	74	Do.	Do.	Do. ?	7	45	Do.
4	J. M.	F.	...	Dr Watt	Demerara	...	...	...	Quinine and arsenic had failed.
5	M. de J.	F.	38	Do.	Do.	Tertian	No recur.	20	Caused <i>typhus aurium</i> .
6	G. J.	F.	21	Do.	Do.	Do.	4	80	Caused some tinnitus.
7	D. F.	M.	25	Do.	Do.	Do.	4	40	Affected ears much.
8	J. G.	M.	20	Do.	Canada	Do.	3	45	No unpleasant effects.
9	J. F.	M.	22	Dr P. W. MacLagan	Demerara	Yellow Fever	13	10 gr. dos.	Disliked from nauseous taste.
10-14	...	...	...	Dr Blair	Do.	...	...	...	Quinine had failed.
15	J. P.	F.	38	Dr Rodie	Do.	Quotidian	4	60	No unpleasant effects.
16	M. de J.	F.	40	Dr Watt	Do.	Tertian	3	48	No affection of head.
17	J. de B.	M.	...	Do.	Do.	Quotidian	9	60	Complicated with affection of spleen; no bad effects.
18	Julio	M.	12	Do.	Do.	Tertian	...	...	Notes of the case lost by Dr Watt.
19	W. C.	M.	20	Do.	Do.	Bilious Remit.	14	84	Relapse from error in diet; no bad effects.
20	W. C.	M.	20	Do.	Do.	Quotidian	4	40	No unpleasant effects.
21	A. M.	M.	56	Dr Bennett.	Ed. Infir.	Tertian	30	240	Head seemed affected by large doses.
22	J. T.	M.	25	Dr Dempster, 21st Regt.	India	Quotidian	5	25	No unpleasant effects.
23	J. B.	M.	21	Do.	Do.	Remittent	6	45	Do.
24	J. A.	M.	23	Do.	Do.	Do.	3	90	Do.
25	J. J.	M.	23	Do.	Do.	Quotidian	9	120	Do.
26	J. M.	M.	26	Do.	Do.	Do.	16	120	Complicated with hepatitis; no bad effects.
27	J. R.	M.	24	Do.	Do.	Feb. cont. com.	23	240 ?	No bad effects. Quinine substat. when bebeerine exhausted.
28	V.	M.	24	Dr Downard 18th N. I.	Do.	Remittent	15	80	Head appeared affected; patient delirious at the time.
29	S.	M.	34	Do.	Do.	Do.	13	70	No unpleasant effects.
30	R.	M.	50	Do.	Do.	Quotidian	6	40	Do.
31	T. G. D.	M.	30	Dr Anderson, 3 Batt. A.	Do.	Do.	6	18	Do.
32	P. F.	M.	30	Do.	Do.	Tertian	7	18	Do.
33	C. L.	M.	29	Do.	Do.	Do.	12	42	Do.
34	D. M.	M.	30	Do.	Do.	Quotidian	11	42	Not effectual; quinine substituted with success.
35	A. D.	F.	28	Do.	Do.	Tertian	14	21	Do.
36-40	4 cases ?	...	...	Dr Godfrey, Bellary	Do.	...	...	...	Not satisfactory.

creased it, till on the third day she took about half a drachm of the sulphate during the fourteen or sixteen hours' intermission. To tell you the truth I was beginning to despair of seeing the sufferings of my patient in any way relieved by it, and would have changed it for some other remedy next day, but such change was not required, as, after the large dose I have mentioned, the usual fit was greatly less in severity, and in a day or two entirely disappeared. Of her own accord my patient fell back upon the bebeerine pills some time afterwards, when the neuralgia was again threatened, and it again speedily disappeared.

Last year I saw a similar case of periodic tic in the face in a lady far advanced in pregnancy. The disease was by no means so severe as in the instance I have already mentioned, but still it was sufficiently annoying. It yielded rapidly when the patient was using the sulphate of bebeerine alone.

I have a lady at present under my care, who, after miscarrying twice in the country, has been suffering from distressing pains in the face, shoulder, and other parts of the body. Before I saw her she had been put on the use of guaiacum, colchicum, &c. under the supposition that the pains were rheumatic. They occur with a kind of irregular periodicity. The patient at the same time suffers from menorrhagia. Quinine, arsenic, &c. have failed to relieve her. Latterly, I placed her upon the use of the sulphate of bebeerine, and at my last visit she stoutly declared that she had derived far more benefit from this medicine than from any others that I had previously prescribed for her. The pains have returned as usual, but are much less severe in their character, and manifestly diminishing in intensity.

During the last year I have seen two or three cases in which ladies, during their puerperal convalescence, have suffered from slight periodic attacks of chilliness, heat, &c., resembling fits of imperfect ague. In one of them the attacks were of a tertian type, and yielded at last to the use of bark. In another, in which the fits of rigor have been more irregular, after in vain trying quinine, arsenic, zinc, &c., the patient has appeared to get more relief, and the disease to be more checked by the bebeerine than by any other form of drug I had used. Both of the two ladies I allude to had, within the last two years, lived abroad in climates where they might have been exposed to marsh miasma.

I have a patient from India, where she had suffered from ague, and whose stomach seems always to rebel against quinine. Since coming to Edinburgh she has had repeatedly a recurrence of aguish symptoms, and has taken the sulphate of bebeerine for them without feeling those symptoms of gastric irritation and headach which the quinine seems to inflict upon her.

In other cases where I have employed the bebeerine, either as antiperiodic or as a tonic, it has appeared to me to have caused far less of those irritating and stimulant effects which we see in some constitutions to be produced by the use of quinine.

If these remarks can be of any use to you they are very heartily at your service.—Yours very truly,

J. Y. SIMPSON.

For the following case I am indebted to my friend, Dr Macfarlan of Charlotte Square, who requested me to see the patient along with him, in consequence of my having in casual conversation with him suggested a trial of the bebeerine.

Case of Intermittent Neuralgia.—A lady, now in her 48th year, was first attacked with supra-orbital tic about sixteen years ago while nursing her fifth child. The attack came on in November and during the prevalent cold north-easterly winds. The suffering was most intense and lasted generally about two hours, coming on about four or five in the afternoon, and on this occasion continuing only for a fortnight, and seeming to yield to Huxham's tincture of bark and generous diet. The disease returned next May, but not in a very severe form. The following spring, however, the powers of the constitution having been much exhausted by anxiety, and the long-continued nursing of a sixth child, whose system had been drained by the depletion necessary to remove a violent bronchitic attack, it came on in a very aggravated form; the pain of forehead agonizing in the extreme; the paroxysm lasting for many hours, and generally ushered in with a chilly fit, and gradually declining under the use of quinine, large quantities of wine, brandy, and animal food during the intermission: the powers of the digestive organs seeming to suffer no diminution by the derangement in the nerves of sensation. These attacks continued to recur with pretty much the same train of symptoms every spring for several years during the prevalence of our easterly winds. Change of air, generally to a sheltered nook in Stirlingshire, proved decidedly beneficial when it could be had recourse to. In 1842, however, the system was considerably enfeebled by her attendance on several members of her family, who required her care on account of scarlatina, &c. In the month of March of that year; and on the approach of east wind in April, the disease set in with great severity and continued longer than usual. Quinine was given to the extent of twenty grains a-day, but not without producing the many unpleasant feelings which generally accompany its use in large and long-continued doses, such as ringing in the ears, derangement of the digestive functions, and a severe febrile state of system. A removal to Stirlingshire, as usual, was followed by a very decided improvement, although the debility on setting out was so great as to make her medical attendant almost dread the risk of removal. 1843 also had its spring of suffering from the disease, and from its antidote. In 1844, by the kind advice of Dr D. MacLagan, she substituted the sulphate of bebeerine for that of quinine, and for weeks took the former in the shape of pill, commencing early in the morning, so as to anticipate the attack, with a dose of gr. iij. repeated every hour or two till she

had taken daily for four or five days as much as gr. xv. ; and at an average for a fortnight gr. xi. a-day. Under this plan the symptoms gradually subsided, or rather never attained to the same degree of severity as in former seasons. I am quite aware that we are not entitled, from a single instance, to infer the superiority of bebeerine to quinine as an antiperiodic in all cases ; but I am very certain that the same quantity of quinine taken by the same individual would have produced very disagreeable effects on the general state and feelings of the patient ; and consequently that in her case the new drug proved a very valuable addition to our *materia medica*.

The following is an extract from a letter to me from Dr Johnston of Berwick-on-Tweed in reply to some inquiries which I addressed to him regarding a case where I understood the bebeerine had been employed. "Mrs D. is not a patient of mine, but I know her well enough. She has suffered of late from several attacks of tic in the face, which have lasted for two or three weeks at a time. She cannot take quinine, for it makes her feverish and nervously irritable, and this always whenever she has tried the remedy. In her last attack, which was about three weeks since, her husband gave her the bebeerine in the same doses that he would have given quinine, and it soon relieved the pain, nor has she had any return of it. She continued the bebeerine for some time, and it produced no inconvenience."

The above cases convey to my mind very good evidence of the powers of bebeerine as a remedial agent. I have confined myself to the testimony in favour of its antiperiodic virtues as communicated to me by others whose ideas cannot be supposed in any way to be biased in its favour, and I have given the cases at full length, that the grounds on which my opinion is founded may be patent to the profession. Of its qualities as a general tonic I am satisfied from repeated trials ; but this is a point of view in which it is not capable of being so precisely observed as in its use in periodic diseases.

The success attending a secret preparation called Warburg's drops, which I regarded as a preparation of bebeerine, cannot, as I formerly thought, be adduced as evidence in its favour ; for I find from a note appended to an abstract of my paper in Buchner's *Repertorium*, (New Series, vol. xxxv. part 3d,) that Buchner and Winckler have detected quinine in this nostrum. I find however, that Winckler agrees with me in believing that bebeerine enters into its composition.

I formerly expressed my opinion that bebeerine differs from quinine in not being so liable to excite the circulation, or affect the nervous system ; and this seems to be borne out by the above

reports, especially those of the neuralgic cases; and it has been found useful by others as well as by myself in other cases where excitant action would be hurtful, as in cases of phthisis accompanied by atonic dyspepsia.

With regard to the mode of administration of bebeerine, I have commonly given it in pill with conserve of roses, in the same way and the same doses as quinine. It can also be readily given in the liquid form, the addition of a few drops of diluted sulphuric acid sufficing to form with it a perfect solution.

129, George Street, Edinburgh,
February 14th 1845.

ART. X.—*Statistical Tables of the Royal Infirmary of Glasgow. Drawn up from the Records of the Institution for 1844, by R. S. ORR, M. D., Superintendent of the Royal Infirmary.*

BEFORE entering upon the following statistical details, I think it proper to state for the information of those who may be unacquainted with the Glasgow Royal Infirmary, that it consists of two distinct buildings; one being for medical and surgical patients, the other for fever patients. That, for the medical and surgical patients contains twelve wards, six being set apart for each class of cases; and in it there are in all about 230 beds. In the fever hospital there are nine wards, and it likewise can accommodate about 230 patients. The two hospitals can therefore contain 460. It is necessary to bear these facts in mind, as in the following tables the statistics of the two hospitals have been kept separate. There no doubt appear among the medical and surgical patients a few cases of fever; but these either gained admittance accidentally, it being doubtful on their admission whether they were really cases of fever or not, or the disease manifested itself some time after they came into hospital, the invariable practice here being, should such cases find their way into the medical wards, to remove them, if at all consistent with the patients' welfare, to the fever hospital, which is set apart for the reception of individuals labouring under contagious diseases. The same is the case in the fever wards when medical or surgical cases accidentally find their way there.

I have been induced to draw up the following tables from two motives; first, from a conviction that the most correct method,—indeed I may say the only correct method—by which general conclusions can be arrived at, is that which is founded on data that

are the results of numerical analysis; and secondly, from a desire that the opportunities which I have enjoyed for making such an analysis might not go altogether unimproved. I regret that the points to which my observation has been directed have been so limited, and I could have wished to have entered more minutely into the details of some of the more interesting classes of cases, but not having data sufficiently extensive to illustrate either their semeiology, etiology, or pathology, I have been obliged to restrict myself to the points touched upon in the following tables. These, it may be mentioned, have been drawn up from that part of the records of the institution which I myself keep; and I have spared neither time nor trouble in rendering them as accurate as I possibly could. In many of the diseases, however, it must be admitted the data are too limited to serve as the ground-work of general conclusions.

The statistics have been divided into two parts. I. Those of the Medical and Surgical Hospital. II. Those of the Fever Hospital.

I have adopted as nearly as possible a physiological arrangement, as being the best calculated to illustrate the subject, and have subdivided the first part into twelve heads. 1. Fevers; 2. Diseases of the nervous system; 3. Of the circulatory system; 4. Of the respiratory system; 5. Of the genito-urinary system; 6. Of the glandular and secreting system; 7. Of the integumentary system; 8. Of the osseous system; 9. Of the articular and fibrous system; 10. Of the chylopoietic system; 11. Diseases of the eye, ear, nose, mouth, throat, &c.; 12. Miscellaneous, or those which could not very properly be arranged under any of the preceding heads. Diseases of doubtful character have been placed under the respective heads where it was thought they would be most likely looked for. I have appended to these twelve divisions a list of the operations performed during the year 1844 amounting to 140, which is about the usual number performed annually.

I.—STATISTICS OF THE MEDICAL AND SURGICAL HOSPITAL.

There were in hospital on the 1st of January 1844, 119 patients; there were admitted during the year, 2067; and there remained on the 31st of December 176, making a total of 2010 cases treated to a termination during the year. Of these, 1234 were males, of whom 131 died, and 776 were females, of whom 66 died.

The following table exhibits a numerical statement of the admissions, dismissions, deaths, average numbers in the house, and mortality per cent. of the cases treated to a termination, for each month in the year.

Table I.

1844.	Admitted.			Dismissed.			Died.			Tot. aver. No. in Ho.			Mortality per cent.		
	Tot.	M.	F.	Tot.	M.	F.	Tot.	M.	F.	Tot.	M.	F.	Tot.	M.	F.
Jan.	182	124	58	124	79	45	21	14	7	142	89	53	14.4	15.5	13.4
Feb.	152	90	62	147	90	57	20	14	6	143	88	55	11.9	13.4	9.5
March.	181	108	73	144	84	60	18	8	10	156	97	59	11.1	8.6	14.2
April.	160	105	55	147	103	44	24	16	8	145	90	55	14.	13.4	15.
May.	187	125	62	164	107	57	21	14	7	157	103	54	11.3	11.5	10.9
June.	177	121	56	156	100	56	9	8	1	156	101	55	5.4	7.4	1.7
July.	176	124	52	163	114	49	14	13	1	157	99	58	7.8	10.2	2.
Aug.	155	114	41	149	101	48	21	14	7	145	83	52	11.9	10.9	14.5
Sept.	148	96	52	130	88	42	8	5	3	150	102	48	5.1	4.9	5.4
Oct.	181	105	76	154	100	54	12	7	5	181	111	70	6.2	6.2	6.1
Nov.	174	108	66	170	112	58	12	5	7	180	108	72	6.7	4.4	9.5
Dec.	194	122	72	165	95	70	17	13	4	170	105	65	8.	9.6	5.2
Total.	2067	1342	725	1813	1173	640	197	131	66	156	98	58	8.2	8.9	8.3

Table II.—Patients treated in the Medical and Surgical Wards of the Infirmary during the year 1844, arranged according to their Diseases.

Diseases.	Case.		Cur.		Re-liev.	Dismis. fm. oth. causes.		Died.		Mortality per cent.		Average residence in days.	
	Tot.	M	F.	M	F.	M.	F.	M	F.	M.	F.	M.	F.
I. Fevers.													
Continued fever, . . .	14	6	7	...	...	1	...	...	...	...	...	17	21
Epidemic fever, . . .	14	3	11	...	...	...	...	...	...	...	...	20	22
Typhus fever, . . .	6	5	1	...	...	...	...	...	...	...	...	27	31
Febricula, . . .	1	1	...	...	...	...	...	...	...	...	...	15	...
Ague, . . .	1	1	...	...	...	...	...	...	...	...	...	14	...
Scarlatina, . . .	2	...	2	...	...	...	...	...	...	...	...	...	10
Total fevers,	38	16	21	...	...	1	...	...	...	...	...	...	...
II. Nervous System.													
Anæsthesia, . . .	1	...	...	1	...	...	...	...	...	...	...	47	...
Apoplexy, . . .	2	1	...	...	...	...	...	1	...	50	...	8	...
Brain, diseased, . . .	2	1	...	1	...	...	...	...	...	...	...	49	...
Cephalalgia, . . .	12	8	1	1	...	1	1	...	...	...	...	16	25
Chorea, . . .	6	1	2	...	2	1	...	...	...	...	...	19	43
Delirium tremens, . . .	5	1	...	...	...	...	...	4	...	80	...	...	...
Epilepsy, . . .	8	...	...	1	1	5	1	...	...	...	...	28	46
Hemiplegia, . . .	13	1	1	4	4	2	...	1	...	12.5	...	32	37
Hypochondriasis, . . .	10	2	1	1	...	5	1	...	...	...	...	12	8
Hysteria, . . .	15	...	11	...	3	...	1	...	...	...	...	...	34
Mania, . . .	2	...	...	...	...	2	...	...	...	...	...	2	...
Mania, puerperal, . . .	1	...	1	...	...	...	...	...	...	...	...	...	24
Melancholia, . . .	1	1	...	...	...	...	...	...	...	...	...	24	...
Neuralgia, . . .	5	1	2	2	...	...	...	...	...	...	...	13	45
Paraplegia, . . .	8	...	...	5	1	1	...	1	...	50.	...	61	17
Paralysis, . . .	3	1	...	1	...	1	...	...	...	...	...	26	...
----- mercurialis, . . .	1	...	...	...	...	...	...	1	100	...	...	62	...
----- partial, . . .	7	...	1	2	1	3	...	...	...	...	...	21	27
Sciatica, . . .	9	4	1	4	...	...	...	...	...	...	...	32	35
Spina bifida, . . .	1	...	...	...	...	...	...	1	...	...	...	...	1
Tic-doloureux, . . .	2	1	1	...	...	...	...	...	...	...	...	47	44
Total,	114	23	22	23	12	21	5	6	2	...	...	...	...

Diseases.	Case.		Cur.		Re- liev.	Dismiss. fm. oth. causes.		Died.		Mortality per cent.		Average residence in days.	
	Tot.	M	F.	M	F.	M.	F.	M.	F.	M.	F.	M.	F.
III. Circulatory System.													
Aneurism of aorta, . . .	1	...	...	...	...	...	...	1	...	100	...	81	...
Disease of heart, . . .	35	...	...	10	7	2	1	11	4	47.8	33.3	26	24
Nævus maternus, . . .	2	...	2	...	...	...	...	...	...	...	...	...	17
Pericarditis, . . .	4	...	1	3	...	...	...	...	...	...	...	33	34
Phlebitis after operation, &c.	7	...	...	...	...	...	...	7	...	...	...	24	...
Phlegmasia dolens, . . .	1	...	...	...	...	...	...	1	...	100	...	...	6
Purpura, . . .	2	1	...	...	...	...	...	1	...	100	...	12	2
Varicose veins, . . .	2	...	...	...	...	1	1	...	...	...	...	4	10
Total, . . .	54	1	3	13	7	3	2	19	6	...	...	...	...
IV. Respiratory System.													
Asthma, . . .	3	...	...	2	...	1	...	...	...	...	...	19	...
Bronchitis, . . .	40	11	10	10	1	...	2	5	1	19.2	7.1	31	24
Catarrh, . . .	4	...	3	...	...	...	...	...	...	...	...	16	8
Empyema, . . .	3	...	1	...	...	...	...	1	...	50	...	26	28
Foreign body in air passages,	1	...	...	...	1	...	...	...	...	...	...	...	47
Laryngitis, . . .	10	1	1	1	3	1	...	3	...	50	...	25	37
Œdema glottidis, . . .	1	...	...	...	...	...	...	1	...	100	...	30	...
Pleuritis, . . .	16	8	3	4	...	...	...	1	...	7.7	...	36	34
Pleuro-pneumonia, . . .	3	1	...	1	1	...	...	...	...	...	...	36	17
Pneumonia, . . .	20	4	7	3	...	...	5	1	4	12.5	12.5	23	36
Phthisis, . . .	63	...	...	27	6	4	4	17	5	35.4	33.3	33	41
Pulmonary emphysema, . . .	1	...	...	1	...	...	...	...	...	...	...	38	...
Total, . . .	165	26	25	50	12	6	6	33	7	...	...	...	...
V. Genito Urinary System.													
Amenorrhœa, . . .	6	...	2	...	4	...	...	...	...	...	...	...	25
Bladder, disease of, . . .	6	2	...	4	...	...	...	...	...	...	...	29	...
Calculus in Urethra, . . .	2	2	...	...	...	...	...	...	...	...	...	19	...
" ——— in vesica, . . .	6	3	...	...	...	2	...	1	...	33.3	...	51	8
Diabetes mellitus, . . .	10	...	...	5	3	...	...	2	...	28.5	...	44	45
Delivery, sequelæ of, . . .	2	...	1	...	...	...	1	...	...	...	...	...	59
Dysmenorrhœa, . . .	2	...	1	...	1	...	...	...	...	...	...	...	17
Epididymis, disease of, . . .	1	...	...	1	...	...	...	...	...	...	...	25	...
Fistula vesico vaginal, . . .	5	...	...	...	1	...	4	...	...	...	...	...	14
Gangrene of labia pudendi,	2	...	1	...	...	...	...	1	...	50	...	...	15
Gonorrhœa, . . .	2	1	...	1	...	...	...	...	...	...	...	12	...
Hæmaturia, . . .	3	...	...	2	...	1	...	...	...	...	...	23	...
Hydrocele, . . .	18	12	...	4	...	2	...	...	...	...	...	20	...
Hydro-sarcocœle, . . .	1	...	...	...	...	1	...	...	...	...	...	5	...
Hysteritis, . . .	1	...	1	...	...	...	...	...	...	...	...	...	29
Injury of scrotum, . . .	2	2	...	...	...	...	...	...	...	...	...	27	...
Ischuria renalis, . . .	1	...	...	...	1	...	...	...	...	...	...	...	8
Leucorrhœa, . . .	3	...	2	...	...	...	1	...	...	...	...	...	55
Lithiasis, . . .	1	1	...	...	...	...	...	...	...	...	...	12	...
Ulceration of labia pudendi,	1	...	1	...	...	...	...	...	...	...	...	...	26
Menorrhagia, . . .	5	...	5	...	...	...	...	...	...	...	...	...	33
Orchitis, . . .	15	14	...	1	...	...	...	...	...	...	...	18	...
Ovarian disease, . . .	2	...	...	...	1	...	1	...	...	...	...	...	32
Penis, cancer of, . . .	2	1	...	...	...	1	...	...	...	...	...	19	...
—— phagedæna of, . . .	1	...	...	...	...	...	1	...	100	...	...	24	...

* The two cases of calculus marked "dismissed from other causes," refer to one individual, who was re-admitted after having been dismissed.

Diseases.	Case.	Cured.		Re- lieve.		Dismiss. fm. oth. causes.		Died.	Mortality per cent.		Average residence in days.	
		Tot.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
Prolapsus uteri, . . .	3	...	...	...	1	...	2	...	...	...	...	12
— vaginae, . . .	1	...	...	1	...	...	...	...	...	...	...	39
Prostate, disease of, . .	7	1	...	...	4	...	2	...	...	...	22	...
Pyoturia, . . .	1	...	...	...	...	1	...	...	...	...	11	...
Spinal chord, tumour of, .	1	1	...	...	...	...	...	...	...	...	5	...
Syphilis, primary, . . .	19	13	1	1	1	2	1	...	...	...	22	35
— secondary, . . .	94	43	39	4	7	1	2	1	1	2	29	40
Testicle, disease of, . .	5	4	...	1	...	...	...	...	...	...	27	...
Urethra, rupture of, . .	1	1	...	...	...	...	...	...	...	...	45	...
— stricture of, . . .	8	3	...	5	...	...	...	...	...	...	24	...
Urine, incontinence of, .	1	...	...	1	...	...	...	...	...	...	...	18
— infiltration of, . . .	3	1	...	...	...	...	2	...	66.6	...	24	...
— retention of, . . .	4	4	...	...	...	...	...	...	...	...	9	...
Uterine disease, . . .	11	...	1	...	1	...	3	6	...	54.5	...	58
Total, . . .	259	109	56	34	17	11	17	6	9	...	...	...
VI. Gland. & Secret. Syst.												
Abscess, chronic, . . .	2	...	...	2	...	...	...	...	...	...	21	...
— of axilla, . . .	1	1	...	...	...	...	...	...	...	...	13	...
— of breast, . . .	4	1	3	...	...	...	...	...	...	...	50	12
— of groin, . . .	4	2	...	1	...	1	...	...	...	...	24	10
— of hip, . . .	3	2	...	...	...	1	...	...	...	...	16	...
— of knee, . . .	3	3	...	...	...	...	...	...	...	...	9	...
— of lab. pudend. . .	1	...	1	...	...	...	...	...	...	...	...	5
— of leg, . . .	6	3	3	...	...	...	...	...	...	...	20	19
— lumbar, . . .	3	...	...	1	...	2	...	...	...	...	14	...
— of neck, . . .	1	1	...	...	...	...	...	...	...	...	7	...
— of perineum, . . .	3	1	...	1	...	1	...	...	...	...	31	...
— psoas, . . .	1	...	...	...	...	1	...	...	...	...	3	...
— sacral, . . .	2	1	...	1	...	...	...	...	...	...	28	...
— of thigh, . . .	2	...	...	1	...	...	1	...	100	...	36	92
Cancer of breast, . . .	7	...	4	...	...	3	...	...	...	...	...	20
Glands, diseased, . . .	3	...	...	1	1	1	...	...	...	...	42	5
Kidneys, . . .	13	2	...	3	...	...	3	5	37.5	...	49	45
Liver, . . .	13	1	6	...	1	...	2	3	50	33.3	16	23
Mammæ, . . .	3	...	2	1	...	...	...	...	...	...	...	39
Spleen, . . .	1	1	...	...	...	...	...	...	...	...	49	...
Icterus, . . .	3	2	1	...	...	...	...	...	...	...	24	41
Nephritis, . . .	3	3	...	...	...	...	...	...	...	...	39	...
Parotitis, . . .	2	2	...	...	...	...	...	...	...	...	18	...
Injury of mamma, . . .	1	...	1	...	...	...	...	...	...	...	...	6
Total, . . .	85	26	21	9	3	7	5	6	8	...	...	...
VII. Integumentary system												
Abdominal sinus, . . .	2	1	1	...	...	...	...	...	...	...	33	14
Cutan. affection of stump, .	1	1	...	...	...	...	...	...	...	...	14	...
Bed sores, . . .	2	...	1	...	...	...	1	...	50	...	...	82
Anasarca, . . .	2	1	1	...	...	...	...	...	...	...	21	...
Cicatrix of burn in neck, .	1	...	1	...	...	...	...	...	...	...	116	...
Inflam. subcell. & fascial, .	2	2	...	...	...	...	...	...	...	...	13	...
Onychia, . . .	4	1	3	...	...	...	...	...	...	...	16	22
Skin cancer of heel, . . .	1	1	...	...	...	...	...	...	...	...	34	...
Eczema, . . .	7	3	3	1	...	...	...	...	...	...	23	34
Herpes, . . .	1	1	...	...	...	...	...	...	...	...	37	...
Ichthyosis, . . .	2	1	1	...	...	...	...	...	...	...	47	...
Impetigo, . . .	6	4	2	...	...	...	...	...	...	...	36	35
Lepre, . . .	8	1	6	1	...	...	...	...	...	...	34	40

Diseases.	Case.	Cured.		Re- liev.		Dismiss. fm. oth. causes.		Died.		Mortality per cent.		Average residence in days.	
	Tot.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
Porriago, . . .	4	2	2	...	...	...	...	...	...	...	...	38	33
Psoriasis, . . .	10	3	2	1	4	...	...	...	...	...	...	26	27
Rupia, . . .	5	5	...	...	...	...	...	...	...	...	...	28	...
Scabies, . . .	10	8	2	...	...	...	...	...	...	...	...	35	30
Sibbens, . . .	1	...	...	...	1	...	...	...	...	...	...	...	74
Sycosis menti, . .	1	1	...	...	...	...	...	...	...	...	...	42	...
Tinea capitis, . .	1	1	...	...	...	...	...	...	...	...	...	65	...
Erysipelas and erythema,	40	22	13	...	...	...	...	4	1	15.3	7.1	19	26
Dog bite, . . .	1	...	1	...	...	...	...	...	...	...	...	...	9
Total,	112	59	36	6	5	...	...	4	2	...	...	...	...
VIII. Osseous System.													
Fractures, 1. Simple.													
Of bones of upper extrem.	59	40	10	2	2	1	4	...	...	...	...	22	17
— of lower extremities	102	71	19	2	...	3	5	2	...	2.5	...	41	34
Of inferior maxilla,	2	1	...	...	...	1	...	...	...	...	...	17	...
— pelvis, . . .	1	...	...	...	...	...	1	...	100	...	...	15	...
— ribs and sternum, .	6	4	1	1	...	...	...	...	...	...	...	26	10
— bones of up. & low. ex.	6	6	...	...	...	...	...	...	...	...	...	48	...
Fractures, 2. Compound.													
Of bones of upper extrem.	8	4	3	...	1	...	...	...	...	...	...	58	49
— lower extremities,	24	15	2	...	...	...	5	2	25	50	...	46	35
Of inferior maxilla,	2	2	...	...	...	...	...	...	...	...	...	20	...
Fractures, 3. Comminuted.													
Of bones of infer. extrem.	4	3	...	...	...	...	1	...	25	...	...	33	...
Bent clavicle, . . .	1	...	1	...	...	...	...	...	...	...	...	...	14
— radius and ulna,	1	...	...	...	...	1	...	...	...	...	...	2	...
Caries and necrosis, .	2	...	2	...	...	...	...	...	...	...	...	...	23
Of ankle, . . .	7	2	1	3	1	...	...	...	...	...	...	23	17
— femur, . . .	5	2	...	1	...	1	...	1	20	...	...	16	...
— fingers, . . .	2	2	...	...	...	...	...	...	...	...	...	14	...
— foot, . . .	2	2	...	...	...	...	...	...	...	...	...	45	...
— ilium, . . .	1	1	...	...	...	...	...	...	...	...	...	23	...
— jaw, . . .	3	2	1	...	...	...	...	...	...	...	...	26	4
— olecranon, . . .	2	2	...	...	...	...	...	...	...	...	...	12	...
— os calcis, . . .	1	...	...	...	1	...	...	...	...	...	...	...	61
— ribs, . . .	1	...	...	1	...	...	...	...	...	...	...	12	...
— mastoid pro. temp. bone	1	...	...	...	1	...	...	...	...	...	...	27	...
— thumb, . . .	1	...	...	...	...	...	1	...	...	...	...	...	14
— tibia, . . .	6	4	...	1	1	...	...	...	...	...	...	25	30
— ulna, . . .	1	...	...	...	1	...	...	...	...	...	...	...	85
Periostitis, chronic, .	1	...	...	1	...	...	...	...	...	...	...	14	...
— of femur, . . .	5	1	2	1	...	1	...	...	...	...	...	20	14
— of humerus, . . .	1	...	...	...	...	1	...	...	...	...	...	10	...
— of infer. maxilla,	1	...	1	...	...	...	...	...	...	...	...	...	70
— of ribs, . . .	1	...	...	1	...	...	...	...	...	...	...	17	...
— of tibia, . . .	4	1	2	...	1	...	...	...	...	...	...	23	15
Spine, disease of, . .	4	2	...	...	...	...	1	...	...	...	...	22	100
— injury of, . . .	7	3	...	1	...	...	...	3	...	42.8	...	16	...
Total,	275	170	45	16	8	10	11	13	2	...	...	...	...
IX. Articular & Fib. Syst.													
Ankle diseased, . .	10	1	5	3	1	...	...	...	...	...	...	18	18
— injured, . . .	11	6	4	1	...	...	...	...	...	...	...	26	5
Knee, diseased, . .	41	9	12	8	4	3	4	1	...	4.7	...	27	23
Hip, . . .	20	...	3	4	3	6	4	...	...	...	...	21	25
Wrist, . . .	8	...	2	2	...	2	1	1	...	20	...	26	12

Diseases.	Tot.	Cured.		Re- lieve.		Dis- mis- sion oth. cause.		Died.		Mortality per cent.		Averag. residen- in days	
	Case.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
Elbow, diseased, . . .	7	8	3	1	...	...	...	...	...	...	...	17	20
injured, . . .	2	1	1	...	...	...	...	...	...	...	...	7	8
Shoulder diseased, . .	1	1	...	...	...	...	...	...	...	...	...	26	...
Luxation of ankle, . .	1	1	...	...	...	...	...	...	...	...	...	18	...
of patella, . . .	1	...	1	...	...	...	...	...	...	...	...	18	...
of hip, . . .	3	1	...	2	...	...	...	...	...	...	...	14	...
of thumb, comp. . .	2	1	1	...	...	...	...	...	...	...	...	47	29
of elbow, . . .	5	2	3	...	...	...	...	...	...	...	...	30	12
of humerus, . . .	3	2	1	...	...	...	...	...	...	...	...	8	1
of humeri, . . .	1	1	...	...	...	...	...	...	...	...	...	2	...
of clavicle, . . .	2	1	1	...	...	...	...	...	...	...	...	28	20
Rheumatism, . . .	85	43	26	8	3	3	...	2	...	6.4	...	22	30
Lumbago, . . .	5	4	...	1	...	...	...	...	...	...	...	44	...
Synovitis, . . .	2	...	...	1	...	1	...	...	...	...	...	32	33
Talipes varus, . . .	3	2	1	...	...	...	...	...	...	...	...	41	91
Tendons, contraction of,	2	...	...	1	...	1	...	...	...	...	...	...	28
Cartilages, ulceration of,	2	...	...	2	...	...	...	...	...	...	...	19	...
Total, . . .	217	79	64	33	12	14	11	2	2	...	...	...	...
X. Chylopoietic System.													
Ascites, . . .	41	10	9	1	3	4	5	6	3	28.5	15.5	33	32
and anasarca, . . .	5	...	2	...	...	...	...	2	1	...	33.3	16	32
Colica pictonum, . . .	2	1	...	...	...	...	...	1	...	50	...	12	...
Cholera, . . .	2	...	2	...	...	...	...	...	...	...	...	...	7
Constipation and debility,	1	...	1	...	...	...	...	...	...	...	...	...	41
Diarrhoea, . . .	13	5	2	...	...	...	4	2	44.4	50	...	16	34
Dysentery, . . .	11	6	...	1	...	1	...	1	2	11.1	...	22	32
Dyspepsia, . . .	55	17	20	4	4	5	5	...	...	...	...	21	25
Enteritis, . . .	1	...	1	...	...	...	...	...	...	...	...	...	21
Fistula in ano and perinaeo,	21	15	2	4	...	...	...	...	...	...	...	28	19
Hæmatemesis, . . .	3	...	1	...	1	...	...	1	...	33.3	...	...	51
Hæmorrhoids, . . .	3	1	2	...	...	...	...	...	...	...	...	22	11
Hernia and sarcocele, . .	1	...	...	...	...	...	...	1	...	100	...	22	...
strangulated femoral,	4	1	2	...	...	...	...	1	...	50	...	9	30
Hydrosarcocele, . . .	1	...	1	...	...	...	...	...	...	...	...	31	...
Melaena, . . .	1	...	1	...	...	...	...	...	...	...	...	...	41
Poisoning with arsenic, . .	2	...	2	...	...	...	...	...	...	...	...	...	4
corros. sublimate, . . .	1	...	...	...	...	...	...	1	...	100	...	6	...
laudanum, . . .	1	...	1	...	...	...	...	...	...	...	...	...	3
sulphuric acid, . . .	1	...	1	...	...	...	...	...	...	...	...	...	11
Polydipsia, . . .	1	...	...	1	...	...	...	...	...	...	...	82	...
Peritonitis, . . .	6	...	1	...	...	...	...	3	2	100	66.6	31	28
Oesophagus injured from } swallowing pins, . . .	1	...	1	...	...	...	...	...	...	...	...	...	13
Oesophagus, injury of, . .	1	...	...	...	...	1	...	...	...	...	...	37	...
Rectum, disease of, . . .	4	2	...	2	...	...	...	...	...	...	...	8	...
Stomach, . . .	4	1	...	...	...	...	...	1	1	33.3	100	21	15
Tabes mesenterica, . . .	1	...	...	1	...	1	...	...	...	...	...	28	...
Tympanites, . . .	1	1	...	...	...	...	...	...	...	...	...	28	...
Total, . . .	189	60	51	15	8	12	10	21	12	...	...	...	...
XI Of the Eye, Ear, Nose, Mouth, Throat, &c.													
Amaurosis, . . .	4	...	...	3	...	...	1	...	...	...	...	28	26
Cancer of eyebrow, . . .	1	...	...	...	...	...	1	...	...	...	...	...	6
Cornitis, . . .	4	3	1	...	...	...	...	...	...	...	...	50	47
Eye, wounds and injury of,	5	3	...	...	...	2	...	...	...	...	...	85	...
Eyelid, tumour of, . . .	1	...	1	...	...	...	...	...	...	...	...	...	27

Diseases.	Tot. Case	Cured.		Be- lieve.		Dismiss. fm. oth. causes.		Died.		Mortality per cent.		Averag residen. in days.	
		M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
Ophthalmia,	6	2	3	1	...	...	...	...	...	...	...	38	12
Polypus and disease of ear,	2	...	2	...	...	...	...	...	...	...	...	...	21
Epistaxis,	1	1	...	...	...	...	...	...	...	...	...	9	...
Lupus,	4	2	1	...	1	...	...	...	...	...	...	30	78
Polypus and disease of nose,	5	3	...	1	...	1	...	...	...	...	...	22	...
Apthæ,	1	...	...	1	...	...	...	...	...	...	...	33	...
Cancrum oris,	1	...	1	...	...	...	...	...	...	...	...	...	6
Cancer and disease of lip,	10	6	1	...	...	2	1	...	...	...	...	29	8
Mouth, injury of,	2	1	...	...	...	1	...	...	...	...	...	5	...
— contrac. of muc. mem. of	1	1	...	...	...	...	...	...	...	...	...	11	...
— corrosion of by carb. pot :	1	1	...	...	...	...	...	...	...	...	...	6	...
Harelip,	1	...	...	...	...	...	...	1	100	...	...	9	...
Tongue, diseased,	4	1	1	...	1	...	1	...	...	...	...	48	78
Water canker of face,	1	...	1	...	...	...	...	...	...	...	...	...	57
Cut-throat,	3	2	...	...	...	...	...	1	33.3	...	...	19	...
Cynanche,	6	2	4	...	...	...	...	...	...	...	...	33	45
Palate, disease of,	1	...	...	1	...	...	...	...	...	...	...	...	18
Total,	65	28	16	6	3	6	4	2	...	...	...	...	...
XII. Miscellaneous.													
Bruises,	66	47	8	1	2	8	...	...	...	...	...	14	13
Burns and scalds,	60	26	13	3	3	1	2	7	5	18.9	21.7	30	27
Burn by sulphuric acid,	1	...	1	...	...	...	...	...	...	...	...	...	11
Debility,	3	1	...	...	...	...	...	2	...	...	...	14	20
Fungus hæmatodes,	2	...	...	...	...	...	1	1	...	50	...	32	...
Foot, disease and injury of,	6	4	1	...	...	...	1	...	...	...	...	26	51
Gangrene of fore arm,	1	1	...	...	...	...	...	...	...	...	...	70	...
— dry, of leg,	1	...	...	...	...	...	...	1	100	...	...	26	...
— of perineum,	1	1	...	...	...	...	...	...	...	...	...	59	...
— of toes,	1	...	1	...	...	...	...	...	...	...	...	...	16
Hypertro. of mast. muscle,	1	...	...	...	...	...	1	...	...	...	...	...	6
Injury of fingers,	19	12	3	...	...	2	1	...	...	...	...	12	24
— of hand,	7	4	...	...	...	1	...	2	28.5	...	...	26	...
— of head,	30	14	1	4	...	1	1	7	26.9	50	...	19	13
— of thumb,	1	1	...	...	...	...	...	...	...	...	...	21	...
— and disease of toes,	9	6	2	1	...	...	...	...	...	...	...	26	20
Melanosis,	1	...	...	...	...	...	...	1	100	...	...	...	3
Serofula,	6	3	...	...	2	1	...	...	...	...	...	12	24
Sequelæ of fever,	1	...	...	...	...	...	...	1	100	...	...	...	33
Tumours of abdomen,	4	...	2	...	...	...	2	...	...	...	...	...	34
— adipose, of neck,	3	1	1	...	...	1	...	...	...	...	...	7	22
— of back,	1	1	...	...	...	...	...	...	...	...	...	1	...
— of groin & thigh	4	1	1	1	1	...	...	...	...	...	...	31	56
— malignant,	4	...	...	1	...	...	1	1	33.3	...	...	3	26
— of scalp,	2	1	1	...	...	...	...	...	...	...	...	6	22
Wounds of face,	1	1	...	...	...	...	...	...	...	...	...	10	...
— gunshot,	1	1	...	...	...	...	...	...	...	...	...	37	...
— incised and punct :	3	1	2	...	...	...	...	...	...	...	...	9	12
— lacerated,	17	11	5	...	...	...	1	...	8.3	...	...	19	26
— poisoned,	1	...	...	...	...	...	...	1	100	...	...	...	19
— of pudendum,	1	...	1	...	...	...	...	...	...	...	...	...	12
— of rectum,	1	1	...	...	...	...	...	...	...	...	...	3	...
— of scalp,	10	7	3	...	...	...	...	...	...	...	...	16	21
— of thigh,	1	1	...	...	...	...	...	...	...	...	...	26	...
Ulcers,	160	78	48	18	4	7	5	...	...	...	...	26	25
Ulceration of head & neck,	1	...	...	...	...	...	1	...	100	...	...	...	16
Moribund,	2	...	...	...	...	...	2	...	100	...	...	1	...
Disease unknown,	3	...	...	1	...	...	2	...	...	...	...	36	6
Total,	437	226	94	30	13	23	17	20	15	...	...	...	...

TABLE III.—OPERATIONS PERFORMED DURING THE YEAR 1844.

OPERATIONS.	Tot.	Diseases or injuries requiring operation.	Complication, or consequence causing death.	Cured.		Relieved.		Died.	
				M.	F.	M.	F.	M.	F.
Amput. prim. of arm,	-	Compound fracture, dislocated elbow } and wrist,	-	1	1			1	
—of hand,	-	Injury by machinery,	-	2					
—of fingers,	10	-	-	8	2				
—of thigh,	6	Compound fracture and laceration, dis- } located knee,	One died of peritonitis,	2		1		1	
—of leg,	-	Compound fracture	-	5					
—of toes,	-	Compound fracture and bruises,	-	4					
—of thumb,	-	Lacerated and gunshot wounds,	-	3				2	
— second. of forearm,	-	Dislocated wrist, traumatic erysipelas,	-						
—of fingers,	6	Caries, anchylosis, onychia,	-	5	1				
—of thumb,	2	Compound dislocation from bite, spha- } celus,	-	1	1				
—of thigh,	-	Caries, diseased knee-joint,	-	4	1			2	
—of leg,	6	Caries, compound fracture, dis. ankle,	Phlebitis,	5				1	
—of foot,	-	Caries,	Phlebitis,	1	1				
—of toe,	1	Bunion on toe,	-						
—of penis	-	Cancer,	Phlebitis,	1				1	
Excision of testicle,	2	Fungoid disease,	-	2					
—of part of muc. mem. of vagina,	1	Prolapsus vaginæ,	-		1				
—of metacarp. bone of thumb,	1	Compound comminuted fracture,	-	1					
—of two metatarsal bones,	1	Compound fracture,	-	1					
Extirpation of tumours :—									
I. Malignant of mamma,	3	Cancer,	-		3				
—of lip,	6	Cancer,	Phlebitis,	4		1		1	
—of testicle,	1	Fungoid protrusion,	-	1					
—of scrotum,	1	Chimney sweepers' cancer,	-	1					

OPERATIONS PERFORMED DURING THE YEAR 1844.—Continued.

OPERATIONS.	Tot.	Diseases or injuries requiring operation.	Complication, or consequence causing death.	Cured.		Relieved.		Died.	
				M.	F.	M.	F.	M.	F.
2. Non-malignant, of neck, -	2	Adipose tumours, -	-	1	1				
_____ of scalp, -	2	Encysted, -	-	1	1				
_____ of rectum, -	1	Polypus, -	-	1					
_____ of thigh, -	1	Encysted, -	-		1				
_____ of arm and cheek, -	2	Nævi materni, -	-		2				
Section of anal fistule, -	15	-	-		2				
_____ of tendo Achillis, -	3	Talipes varus and equinus	-	13	2				
_____ subcutaneous, -	1	Torticollis, -	-	2	1				
_____ of biceps, -	1	Contracted elbow, -	-		1	1			
_____ of hamstrings, -	1	Contracted ham, -	-	1					
Reduction of hernia by operation, -	4	Strangulated femoral hernia, -	-	1	2			1	1
Hæmip., -	1	-	-						
Urethrotomy, -	2	Calculus in urethra, -	Diarrhœa, -	2					
Lithotomy, -	3	Calculus in vesica, -	-	3					
Lithetrixy, -	2	Calculus in vesica, -	-		1	1		2	1
Tracheotomy, -	5	Secondary syphilis, foreign bodies, -	Asphyxia, -	1					
Trephine, -	2	Compound fracture and depression of skull, -	-						2
Hydrocele, injection of -	6	-	-	5					
Reduction of hip, -	1	Dislocation, -	-	1		1			
_____ of shoulder, -	2	Do. -	-	2					
_____ of both shoulders, -	1	Do. -	-	1					
_____ of elbow, -	1	Do. (of seven weeks' standing), -	-		1				
Ligature of polypi, -	5	Of nose, ear, &c., -	-	4	1				
	140			91	26	3	3	12	6

II.—STATISTICS OF THE FEVER HOSPITAL.

There were in the Fever Hospital on 1st of January 1844, 145 patients ; there were admitted during the year 1360 ; and there remained on the 31st December 37, making the whole cases treated to a termination during the year amount to 1468 ; of these 769 were males, of whom 82 died, and 699 females, of whom 61 died.

The following is a specification of the diseases under which these patients laboured.

TABLE IV.				Cases.	Cured.	Died.
Common continued fever,	-	-	-	261	242	19
Continued fever with relapse,	-	-	-	432	416	16
Typhus fever,	-	-	-	708	615	93
Typhus and gangrene of lungs	-	-	-	3	—	3
Febricula,	-	-	-	10	10	—
Sequelæ of fever,	-	-	-	1	1	—
Rubeola,	-	-	-	1	1	—
Scarlatina,	-	-	-	13	13	—
Variola,	-	-	-	10	10	—
Apoplexy,	-	-	-	1	—	1
Asthma,	-	-	-	1	1	—
Bed sores,	-	-	-	2	—	2
Catarrh,	-	-	-	2	2	—
Debility,	-	-	-	3	2	1
Delirium tremens,	-	-	-	1	1	—
Diarrhœa,	-	-	-	1	—	1
Jaundice,	-	-	-	1	1	—
Moribund,	-	-	-	4	—	4
Partial paralysis,	-	-	-	1	1	—
Pertussis and bronchitis,	-	-	-	1	1	—
Pleuritis,	-	-	-	1	1	—
Pneumonia,	-	-	-	7	5	2
Rheumatism,	-	-	-	1	1	—
Mania,	-	-	-	2	1	1
Total, 1468				1325	143	

Of these different diseases the first three only afford data sufficiently comprehensive on which to found statistical observations, and the others are not included in any of the tables with the exception of that which immediately follows, and table xiv. being in reality, with the exception of the eruptive fevers, more properly cases for the medical and surgical wards of an hospital, than for the fever wards. The three cases of gangrene of the lungs occurring in conjunction with typhus happened at a time when chest complications were extremely prevalent, namely, in the month of June, which, as will be seen, was the most fatal month during the year,—the mortality ranging as high as 16 per cent. or one in 6.

In order that a clear view may be given of the state of the hospital during the year, I have added the following table, which I

prepared for the Glasgow Infirmary annual report, but with the addition of a column for the mortality.

Table V. showing the admissions, dismissions, deaths, average numbers, and mortality per cent. in the fever hospital during 1844.

1844.	Admitted.			Dismissed.			Died.			Av. Nos. in Hosp.			Mortality per cent.		
	Tot.	M.	F.	Tot.	M.	F.	Tot.	M.	F.	Tot.	M.	F.	Tot.	M.	F.
Jan.	224	136	88	222	115	107	12	6	6	141	77	64	5.1	4.9	5.3
Feb.	156	86	70	179	110	69	13	15	3	123	62	61	9.1	12	4.1
March	140	76	64	135	66	69	9	5	4	93	46	47	6.5	7	5.4
April	132	61	71	135	65	70	11	6	5	86	41	45	7.5	8.4	6.6
May	126	56	70	119	54	61	17	9	8	72	32	40	12.5	13.4	11.7
June	111	70	41	99	53	46	19	12	7	70	37	33	16.1	18.4	13.2
July	82	37	45	86	44	44	7	2	5	54	24	30	7.3	4.3	10.2
Aug.	93	47	46	69	34	35	9	5	4	47	24	23	10.1	12.6	10.2
Sept.	66	33	33	77	38	39	12	6	6	48	23	25	13.3	13.3	13.1
Oct.	82	40	42	73	36	37	12	5	7	50	25	25	14.1	12.1	15.9
Nov.	81	42	39	65	32	31	10	6	4	43	21	22	13.3	15.3	11.1
Dec.	67	35	32	64	35	29	7	5	2	41	20	21	9.8	12.5	6.5
Total	1360	719	641	1325	687	638	143	82	61	72	36	36	9.7	10.6	8.7

From this table it appears that the number of admissions and dismissions pretty steadily declined from the first to the last month in the year, from above 200 a month to below 70. During the first five months this may be accounted for by the gradual decrease of the epidemic fever which had raged during the greater part of 1843. As it declined the typhus and common continued fever cases again began to appear, from having previously, for almost nine months, been scarcely ever seen, so completely did the epidemic take their place. This, however, will be more clearly brought out in a subsequent table.

The average number daily in hospital for the year is the same for both males and females, 36. This may appear inconsistent, when on referring to the tables it is observed that the males dismissed and dead preponderate by 70; but the explanation is afforded by the longer residence of the females, which is uniformly shown to be the case in the tables that follow. The mortality was always higher in the male than in the female cases, with the exception of the months of January, July, and October, when it was lower, and this uniformity is the principal circumstance which this table brings out respecting the mortality.

The next table exhibits a monthly arrangement of the three different forms of fever.

Table VI. showing the number of cases of fever dismissed and dead for each month of the year 1844.

1844.	Epidemic fever of 1843-4.					Com. continued fever.					Typhus fever.					Mortality per cent.		
	Tot.		Cured.		Died.	Tot.		Cured.		Died.	Tot.		Cured.		Died.	Epi. Cont. Typ.		
	M.	F.	M.	F.	M.	M.	F.	M.	F.	M.	M.	F.	M.	F.	M.	cases	cases	cases
Jan.	182	89	87	1	5	...	...	...	...	...	48	26	16	5	1	3.6	...	12.4
Feb.	125	66	51	6	2	...	...	...	...	...	70	43	17	9	1	6.4	...	14.2
March,	66	25	41	...	...	16	9	6	...	1	58	28	22	5	3	...	6.2	13.7
April,	20	6	13	...	1	28	13	15	...	...	91	44	38	6	3	5	...	9.8
May,	12	5	6	1	...	25	9	13	2	1	94	44	40	5	5	8.3	1.2	10.6
June,	7	5	2	...	...	39	14	17	4	4	68	35	26	5	2	...	20.5	10.2
July,	8	3	5	...	...	26	12	13	...	4	57	27	26	1	3	...	3.3	7
Aug.	4	3	1	...	...	25	8	13	3	1	43	20	18	2	3	...	16	11.6
Sept.	3	1	2	...	...	35	17	18	...	...	44	16	17	6	5	...	...	25
Oct.	1	1	...	...	...	25	9	15	1	...	53	26	18	3	6	...	4	17
Nov.	4	1	3	...	...	19	9	10	...	...	44	21	14	5	4	...	...	20.4
Dec.	...	...	...	...	...	23	12	10	1	...	38	20	13	3	2	...	4.3	13.1
Total,	432	205	211	8	8	261	112	130	11	8	708	350	265	55	38	3.7	7.2	13.1

Under "Epidemic fever of 1843-4" are here included all the cases of fever in which relapse took place, as this was its almost constant attendant, and the best characteristic on which to found a correct diagnosis, for although many other symptoms, such as gastric, catarrhal, icteric, rheumatic, &c., occurred at different periods during the epidemic, these could not be so well relied on as the relapse which happened in almost every case, with whatever other symptoms the disease might be attended. As will be seen from the above table this form continued gradually to decline till about the months of April and May, when, although it had not entirely ceased, still the cases were so few in number that the epidemic might be said to have terminated, and the common continued fever again to prevail. During the whole of the year the typhus cases formed a pretty fair proportion of those treated, and their numbers after the month of May declined, and, what is remarkable, did not again increase as the winter approached. This was the more to have been expected, considering that a vast number of those who in 1843 suffered from the epidemic, must have been left in a very weak and debilitated state, and on that account would be more likely to be attacked by typhus, for it is well known that having laboured under one of these forms gave no immunity from the other. The most probable reason for the very small number of cases, both of typhus and continued fever occurring at the end of the year, was the extreme mildness of the winter season.

In the first of the two preceding tables I have given a numerical statement of the numbers admitted, dismissed, and dead, the

average numbers in hospital, and the mortality; in the second this has been subdivided into the three different forms of fever which prevailed during the year, thus exhibiting at one view the relative proportions in which each form prevailed during each month. In those that follow a still further subdivision is made, the cases in each form being arranged according to the different ages, and showing the cures, deaths, mortality, and average residence of the patients. I have been induced to add the column showing the mortality per cent. at each age of the whole number of deaths, from having been informed by Dr Watt, author of the valuable statistics of this city, that, in a given number of deaths from any particular disease, the deaths at each age bear a uniform proportion to the whole number of deaths, and this is entirely independent of all collateral circumstances. In his elaborate statistics for the years 1841-1842, he states his conviction that there are specific laws which regulate the amount of deaths at the different ages, "and that a knowledge of these laws may be expected both to lead to improved modes of medical treatment, and also to aid the introduction of such sanatory regulations as would insure to the city of Glasgow one of the greatest of social blessings—a healthy population." These opinions he mentions he has fully confirmed from inspection of the mortality bills of New York and Philadelphia, as well as from the returns of most of the larger towns in Scotland. His results, however, are drawn from a much larger number of cases than the statistics of any single institution for one year could afford, and it requires the calculations to be made from a much more extended series of observations to bring out fully his conclusions.

Before proceeding to give an analysis of the fever cases for 1844, according to the above plan, I have, in order that a complete view may be given of the epidemic from its rise to its decline as it occurred in this hospital, drawn up the table which immediately follows, from the records of the year 1843, during which it appears that the number of individuals admitted with this form of fever amounted to no less than 2871. This, with the table which follows it, show the whole numbers treated in the hospital from the commencement of the epidemic to amount to 3303. Dr Perry, in his paper on the sanatory state of Glasgow, published some months ago in this Journal, calculates the total number of cases treated in Glasgow and suburbs to amount to 32,000. Now, taking into account the cases that have occurred of this disease since that paper was written, I feel sure that I am within bounds when I say that 40,000 have been treated in Glasgow and suburbs on account of it.

Table VII. showing the number of fever cases with relapse, the mortality, &c. for 1843, arranged according to the ages of the patients.

1843. Ages.	Total cases.	Cured.		Died.		Mortality per cent.			Average residence in days.			Of whole No. of deaths, mort. per ct. at each age.			Average residence of the cases that died in days.		
		M.	F.	M.	F.	Tot.	M.	F.	Tot.	M.	F.	Tot.	M.	F.	Tot.	M.	F.
1 to 10	92	44	47	...	1	1	...	2	16	15	16	7	...	1	...	...	2
10 to 15	276	131	144	1	...	0.3	0.7	...	14	13	15	7	1.4	...	...	6	...
15 to 20	562	234	319	5	4	1.6	2	1.2	15	13	16	6.9	7.2	6.6	4	3	6
20 to 30	964	403	560	16	15	3.2	3.8	2.7	15	14	17	24	23.1	25	7	7	8
30 to 40	464	214	251	16	13	6.2	6.9	5.5	17	15	18	22.4	23.1	21.6	8	10	6
40 to 50	384	111	183	10	10	7.0	8.2	6.1	18	17	19	15.5	14.4	16.8	8	10	6
50 to 60	143	56	64	14	9	16.7	20	12.3	17	16	19	17.8	20.2	15	8	6	12
above 60	86	32	39	7	8	17.4	17.9	17	20	19	21	11.6	10.1	13.3	9	13	7
Totals	2871	1225	1517	69	60	4.1	5.3	3.8	16	15	17	...	...	...	...	...	...

The mortality is by this table shown to increase steadily from the age of 15 and upwards, and uniformly to be greater in the males than in the females.

I have had many opportunities, during the late epidemic, of observing the circumstance (which I think Dr Alison has before remarked with regard to fever generally,) that when a whole family was admitted to the hospital, as often took place in one day, and when death occurred among them it almost invariably seized for its victim either the father or the mother, leaving in many cases their children helpless and unprovided for, thus showing of what immense importance it is to remove immediately from their own residence the first individual attacked with the disease, which very generally happens to be one of the younger members of the family.

The average residence of the patients appears to have been uniformly longer in the female than in the male cases, by from one to three days.

Table VIII. showing the number of fever cases with relapse, the mortality, &c. arranged according to the ages of the patient.

1843. Ages.	Total male & female cases.	Cured.		Died.		Mortality per cent.			Average residence.			Of whole No. of deaths, mort. per ct. at each age.			Average resi- dence of the cases that died.			
		M.	F.	Tot.	M.	F.	Tot.	M.	F.	Tot.	M.	F.	Tot.	M.	F.	Tot.	M.	F.
1 to 10	9	4	5	...	...	...	...	...	20	18	22	...	...	...	...	...	...	...
10 to 15	31	14	17	...	...	...	...	...	18	17	19	...	...	...	...	...	...	...
15 to 20	86	42	46	...	...	...	...	...	18	17	19	...	...	...	...	...	...	...
20 to 30	155	74	78	7	9	4	4.4	3.8	5.0	19	18	20	43.7	18.7	25	14	10	17
30 to 40	75	34	39	2	1	1	2.6	2.8	2.5	19	17	20	12.5	6.2	6.2	4	5	4
40 to 50	45	25	16	4	3	1	8.8	10.7	5.8	25	24	28	25	18.7	6.2	18	13	33
50 to 60	17	8	8	1	1	...	5.8	11.1	...	18	17	19	6.2	6.2	...	18	18	...
above 60	11	4	5	2	...	2	18.1	...	28.5	19	20	18	12.5	...	12.5	3	...	3
Totals	432	205	211	16	8	8	3.7	3.9	3.7	19	19	21	...	...	...	...	...	...

It was to be expected that in this class of cases, which constitute the remainder of the epidemic that raged to such an extent in most of the large towns in Scotland from about the month of March 1843 to April or May 1844, there would be but few complications, as we cannot count as such the articular, rheumatic,

icteric, gastric, and other symptoms which accompanied it, these being rather a part of the disease itself. Accordingly I find in the books of the infirmary only three cases which can properly be ranked under the head of complications;—one was a male between 30 and 40 affected with pneumonia, who, after a 14 days' residence, was dismissed cured;—the other two, were cases of erysipelas in females, one between 15 and 20, the other between 20 and 30, who were both cured, the former after 35 days' residence, the latter after 52 days. The month of May, as already stated, may be said to have terminated this epidemic, not more than eighteen cases of this kind having been admitted after that period, and these are scattered over the remaining months of the year, the last case having been admitted on the 21st of October, and dismissed on the 14th of November. Occasional cases sometimes, however, are seen even yet, two having been dismissed in January who were admitted in December.

The mortality is rather lower in this than in the table for 1843, the average residence higher, the fatality being greatest in the male cases, and the residence longest in the female cases.

Table IX.—Of the deaths from this form of fever during 1844, there happened,

				Males.	Females.	Total.
On the 8th day from seizure				—	1	1
do. 9th	do.	do.		—	1	1
do. 10th	do.	do.		1	—	1
do. 12th	do.	do.		1	—	1
do. 13th	do.	do.		1	—	1
do. 14th	do.	do.		1	1	2
do. 16th	do.	do.		—	1	1
do. 17th	do.	do.		1	2	3
do. 18th	do.	do.		1	—	1
do. 24th	do.	do.		—	1	1
do. 25th	do.	do.		1	—	1
do. 26th	do.	do.		1	—	1
do. 36th	do.	do.		—	1	1
				8	8	16

TABLE X. showing the Number of common Continued Fever Cases, the Mortality, &c. arranged according to the Ages of the Patients.

1844. Ages.	Total cases.	Cured.		Died.			Mortality per cent.			Average residence.			Of whole No. of deaths, mort. per ct. at each age.			Average residence of the cases that died		
	M & F	M.	F.	Tot.	M.	F.	Tot.	M.	F.	Tot.	M.	F.	Tot.	M.	F.	Tot.	M.	F.
1 to 10	23	10	13	...	...	...	...	...	...	18	15	20	...	...	...	...	...	...
10 — 15	26	13	13	...	...	...	...	...	...	18	17	19	...	...	...	...	...	...
15 — 20	53	22	30	1	1	...	1.8	4.3	...	16	16	16	8.8	5.8	...	5	5	...
20 — 30	91	38	45	8	7	1	8.7	15.5	2.1	15	13	16	42.1	36.8	5.8	20	21	8
30 — 40	28	11	15	2	...	2	7.1	...	11.7	14	10	17	10.5	...	10.5	10	...	10
40 — 50	23	13	4	6	3	3	26.	18.7	42.8	13	11	16	31.5	15.7	15.7	6	5	7
50 — 60	11	2	7	2	...	2	18.1	...	22.2	15	9	16	10.5	...	10.5	6	...	6
above 60	6	3	3	...	...	...	...	...	...	16	15	17	...	...	...	...	...	...
Totals,	261	112	130	19	11	8	7.2	8.9	5.8	15	13	17	...	...	...	11	15	7

Included in the above numbers are the following complications. Four cases of pneumonia, one of whom, a female between 40 and 50, died, her residence being three days; the other three cases, viz. one a male, residence 17 days, and the other two, females, residences 18 and 54 days respectively, between the ages of 20 and 30,—recovered. Two cases of erysipelas in females, one between 20 and 30, residence 37 days, the other between 30 and 40, residence 29 days, recovered. Two cases of dysentery in males, one between 15 and 20, after 49 days' residence, recovered, the other between 20 and 30, after 27 days, died. One female, between 30 and 40, had roseola, residence 14 days, and recovered; one male, in addition to the common continued fever, took typhus, and died after 31 days' residence; he was between 20 and 30 years of age.

Table XI.—Of the deaths from this form there happened,

				Males.	Females.	Total.
On the 9th day from seizure				1	—	1
do.	12th	do.	do.	2	—	2
do.	13th	do.	do.	1	1	2
do.	14th	do.	do.	1	—	1
do.	15th	do.	do.	—	1	1
do.	16th	do.	do.	—	2	2
do.	19th	do.	do.	—	1	1
do.	21st	do.	do.	1	1	2
do.	22d	do.	do.	1	—	1
do.	34th	do.	do.	—	1	1
do.	35th	do.	do.	1	—	1
do.	40th	do.	do.	1	—	1
do.	53d	do.	do.	1	—	1
Date of seizure unknown in				1	1	2
				11	8	19

Table XII. showing the number of Typhus Cases, the mortality, &c., arranged according to their ages.

1844. Ages.	Total Cases.	Cured.		Died.			Mortality per cent.			Average residence in days.			Of whole No. of deaths, mort. per ct. at each age.			Average residence of the cases that died in days.		
		M.	F.	Tot.	M.	F.	Tot.	M.	F.	Tot.	M.	F.	Tot.	M.	F.	Tot.	M.	F.
1 to 10	17	9	8	...	...	...	...	...	...	18	16	20	...	...	...	...	...	...
10 to 15	79	44	34	4	2	2	5.5	4.3	7.6	30	17	31	4.3	2.1	2.1	9	7	11
15 to 20	146	68	60	9	5	4	6.1	6.8	5.4	30	17	31	9.6	5.3	4.3	6	5	8
20 to 30	230	119	85	26	14	19	11.3	10.5	12.3	15	19	19	27.9	15.7	12.9	10	8	13
30 to 40	137	74	60	13	10	3	9.4	11.9	5.6	18	16	30	13.9	10.7	3.2	9	11	6
40 to 50	73	30	19	23	15	8	31.9	33.3	29.6	19	18	20	24.7	16.1	8.6	6	5	9
50 to 60	27	5	9	13	7	6	48.1	58.3	40.0	15	12	18	13.9	7.5	6.4	5	5	6
above 60	7	1	1	5	2	3	71.4	66.6	75.0	9	12	6	5.3	2.1	3.2	2	1	3
Totals.	708	350	365	93	55	38	13.1	13.5	12.5	16	15	18	...	...	...	7	7	9

Among the cases in this table, ten were complicated with pneumonia, of which four died; between the ages of 15 and 20, one female died after 14 days' residence; between the ages of 20 and 30, one male and three females were cured, their average residence being 28 days; and one male and one female died, the residence of the former being 40 days, that of the latter 12; from 30 to 40, one female was cured, her residence being 17 days;

from 40 to 50, one male died, his residence being 9 days ; and one female was cured, her residence being 26 days.

In five females the disease was complicated with erysipelas, two of whom between the ages of 20 and 30 died, the residence of the one being 24, and that of the other 34 days ; the other three were cured, one being between 30 and 40, one between 40 and 50, and one between 50 and 60, their respective residences being 59, 59, and 30 days.

One male case, from 10 to 15 years of age, was complicated with scarlatina, residence 34 days ; one female from 15 to 20 with variola, residence 61 days, these all recovered ; one female from 20 to 30 with delirium tremens, residence three days, died.

Table XIII.—Of the deaths occurring from typhus there happened,

				Males.	Females.	Total.
On the 8th day from seizure				1	1	2
do. 9th	do.	do.		5	2	7
do. 10th	do.	do.		4	2	6
do. 11th	do.	do.		2	4	6
do. 12th	do.	do.		6	2	8
do. 13th	do.	do.		2	4	6
do. 14th	do.	do.		1	1	2
do. 15th	do.	do.		2	5	7
do. 16th	do.	do.		7	1	8
do. 17th	do.	do.		2	1	3
do. 18th	do.	do.		3	1	4
do. 19th	do.	do.		1	—	1
do. 20th	do.	do.		3	3	6
do. 21st	do.	do.		—	1	1
do. 22d	do.	do.		—	3	3
do. 23d	do.	do.		—	2	2
do. 24th	do.	do.		1	1	2
do. 25th	do.	do.		—	2	2
do. 26th	do.	do.		1	2	3
do. 27th	do.	do.		1	—	1
do. 45th	do.	do.		1	—	1
do. 46th	do.	do.		1	—	1
do. 48th	do.	do.		1	—	1
Date of seizure unknown in				10	—	10
				55	38	93

Table XIV. is arranged so as to show the districts and localities from which the patients admitted into the Fever Hospital were brought, with the numbers cured, and dead.

TABLE XIV. showing the Districts from which the Fever Patients were admitted during the Year 1844, with the numbers Cured and Dead.

From City Districts.	Total.	Cured.	Died.	From the Suburbs and Ex- tremities of City.	Total.	Cured.	Died.	From Country Villages.	Total.	Cured.	Died.
No. 1.	57	54	3	Finnieston,	2	1	1	East Kilpatrick,	1	1	1
2.	61	55	6	Anderson,	31	27	4	Duntocher,	1	1	1
3.	65	61	4	Springbank,	23	20	3	Milngavie,	2	1	1
4.	14	12	2	Black Quarry,	10	10		Maryhill,	5	3	
5.	10	9	1	Port-Dundas,	15	13	2	Partick,	1	1	
6.	34	34		Cowcaddens,	13	11	2	Woodside,	3	3	
7.	23	21	2	Springburn,	5	5		Renfrew,	2	2	
8.	19	17	2	Carnegie,	5	4	1	Govan,	1	1	
9.	29	24	5	Parkhead and Camlachie,	43	40	3	Strathbungo,	1	1	
10.	17	14	3	Dalmarnock and Bridgeton,	105	93	12	Aitkenhead,	1	1	
11.	82	75	7	Mill-Ead and Calton,	151	134	17	Pollokshaws,	2	1	1
12.	39	36	1					Thornliebank,	1	1	
13.	46	40	6		403	359	45	Eaglesham,	4	4	
14.	44	37	7	SOUTH SIDE OF THE RIVER.				Rutherglen,	3	2	1
15.	81	72	9					West Arthurlie,	2	2	
16.	18	13	5	Hutchesontown,	40	34	2	Neilston,	4	4	
17.	2	1	1	Gorbals,	59	52	7	Netherlie,	1	1	
				Laurieston and Tradeston,	75	62	18	Hamilton,	1	1	
	641	577	64		174	152	22	Blantyre,	1	1	
FROM THE SEVERAL PUB- LIC INSTITUTIONS.								Wishaw,	1	1	
Town's Hospital,	7	7						Calder,	1	1	
Night Asylum,	22	22						Coatbridge,	5	4	1
Police Office and Houseless,	46	44	2					Dundyvan,	3	3	
Female House of Refuge,	9	9						Clyde Iron Works,	1	1	
Lunatic Asylum,	1	1						Tollcross,	2	2	
Medical and Surgical, }								Kirkintilloch,	1	1	
Wards of Infirmary, }	4	3	1					Provan Mills,	1	1	
	89	86	3					Unknown,	1	1	
									53	47	6

ART. XI.—On the frequent spontaneous cure of Pulmonary Consumption, and the indications furnished by Pathology for its rational treatment. By JOHN HUGHES BENNETT, M. D., F. R. S. E., Lecturer on the Practice of Physic, and on Clinical Medicine, Pathologist to the Royal Infirmary, &c. &c. (Read to the Medico-Chirurgical Society of Edinburgh, March 5, 1845.)

EVERY one who has been much accustomed to make *post mortem* examinations must occasionally have observed puckerings or contractions in the substance of the lungs, sometimes conjoined externally with dense white cicatrices, or internally with cretaceous or calcareous concretions. From the frequency with which these cicatrices and concretions are met with, it is certain that, if they indicate the previous existence of tubercle, this lesion heals spontaneously much more frequently than is generally supposed. Indeed, if this opinion respecting them be correct, then tubercular disease of the lung, instead of being almost invariably fatal, as it is considered by the public and the great majority of the profession, must not only heal spontaneously in a few cases, but this must be a very frequent occurrence. Such will appear from the following statement:—

Of 73 bodies which I have examined since last November, I have found puckerings or concretions in the lungs in 28.

Of these, puckerings existed with induration alone in 12, with cretaceous or calcareous concretions in 16.

They occurred in the right lung seven times, in the left lung twice, and in both lungs nineteen times.

In upwards of 500 bodies, which have been examined either by myself or under my direction since August 1843, these lesions have been found equally frequent, but from many of them having been confounded with pleuritic adhesions, or not otherwise particularly noticed, their relative frequency cannot be ascertained with exactness.

On referring to the observations of those who have conducted their inquiries on a sufficiently extensive scale, I find that M. Rogée,* in 100 bodies examined at the Salpêtrière Hospital in Paris, discovered these lesions in 51, more than half. M. Boudet,† in a memoir presented to the Académie des Sciences, says, that of 135 bodies he has examined, he found them in 116, about four-fifths of the whole. The average age of these individuals is not stated, but it varied from fifteen to seventy-six years. In the Salpêtrière we know that all the inmates are of advanced age.

* Archives Générales de Médecine, Vol. v. 1839. This admirable Memoir certainly deserves more attention than it hitherto seems to have met with.

† Comptes Rendus, Tome 6me, 1843.

In the 28 cases alluded to I have found pulmonary puckerings and concretions in 3 individuals of the age of 18 ; in 6, between that age and 40 ; and in 19 after that epoch of life. There can be little doubt that they are most common in elderly individuals who have escaped the diseases incident to youth, and hence probably may be explained the large proportion met with in some of the Parisian hospitals.

It may be well, before proceeding further, to determine whether the lesions now alluded to are really proofs of cured tubercular deposits in the lung. This seems to be established by the following facts :—

1. A form of indurated and circumscribed tubercle is frequently met with, gritty to the feel, which, on being dried, closely resembles cretaceous concretions.

2. These concretions are found exactly in the same situation as tubercle. Thus they are most common in the apex, and in both lungs. They frequently occur in the bronchial, mesenteric, and other lymphatic glands, and in the *psosæ* muscles, or other textures which have been the seat of tubercular depositions, or scrofulous abscesses.

3. When a lung is the seat of tubercular infiltration throughout, whilst recent tubercle occupies the inferior portion, and older tubercle and perhaps caverns the superior, the cretaceous and calcareous concretions will be found at the apex.

4. A comparison of the opposite lungs will frequently show, that whilst on one side there is firm encysted tubercle, partly transformed into cretaceous matter, that on the other the transformation is perfect, and has occasionally even passed into a calcareous substance of stony hardness.

5. The puckerings found without these concretions exactly resemble those in which they exist. Moreover, whilst puckering with gray induration may be found at the apex of one lung, a puckering surrounding a concretion may be found in the apex of the other.

6. and lastly. The seat of cicatrices admit of the same exceptions, as the seat of tubercles. In one case I have found the puckering and cicatrix in the inferior lobe only, and have met with three cases, where the inferior lobe was throughout densely infiltrated with tubercle, whilst the superior was only slightly affected.

If further proof be required to convince us that these puckerings and concretions are really evidences of cured tubercle, it will be found in the circumstance, that since the days of Laennec, (by whom they were minutely described and figured,) no pathologist has called in question a fact which seems so well established.

Hitherto, however, these lesions have been considered as oc-

curing very seldom. Laennec records only six cases; Andral eight; and various writers have published isolated cases as worthy remark from their rarity. Dr Williams says, "It is not uncommon to find in the lungs of those who have long laboured under symptoms of pulmonary consumption, some of the cavities with a lining more or less perfect, and, at the apex of the lung especially, there may be *now and then* found a cavity contracted almost to obliteration; and *sometimes* a mere cicatrix, perhaps enclosing a little friable caseous matter."* Such is the general belief.

On the other hand, the observations of Rogée and Boudet in Paris, confirmed as they are by my own in the Royal Infirmary of this city, will probably serve to establish that this spontaneous cure of tubercle has occurred in the proportion of from one-third to one-half of all the individuals who die after the age of forty.

Although this result may with some excite surprise as being quite contrary to a prevailing opinion, it is easy to show that neither the chemical or structural composition of tubercle, or the nature of the action which accompanies its deposition, are in any way opposed to the facts revealed by morbid anatomy.

Without entering minutely into the consideration of these subjects, it may be said that the chemistry of tubercle is still very imperfect, and that it only differs from lymph, in its early stage, by being more albuminous, and in its latter stages by possessing a larger amount of earthy salts.

As regards the structure of tubercle, it is certainly not malignant. Gulliver and Vogel, indeed, have described it, under certain circumstances, to be composed of nucleated cells. On the other hand, notwithstanding I have carefully examined tubercle in numerous cases, in all its forms, I have never been able to discover such a formation. On this point, the observations of Liebert more nearly agree with my own, which have always shown me that tubercle was composed of numerous granules, and of corpuscles of an irregular shape, difficult, perhaps, to be described, but in the aggregate readily recognized by an experienced eye.

Then, with regard to the action which accompanies the deposition of tubercle, two opinions have been contended for. By some it is maintained to be a constitutional disease, and to be produced independent of inflammation. Others assert that it is an inflammatory product. Great names are to be found in the ranks of both parties. In the one are Bayle, Laennec, Chomel, and Louis; in the other are Broussais, Bouilaud, Cruveilhier, and Andral. In this country the inflammatory origin of tubercle has been most ably contended for by Dr Alison, whilst it has been opposed by Dr Carswell and Sir James Clark.

A moment's consideration will show that the whole discussion depends upon what is meant by inflammation. If by that term

* Diseases of the Chest, 4th ed. p. 192.

be understood pain, heat, redness, and swelling or the presence of lymph or pus, then certainly tubercle is not inflammatory. If, on the other hand, we consider that the essential phenomenon of inflammation is an increased exudation of the blood-plasma, then tubercle must be regarded as an inflammatory product. Such it appears to us is the only view that will reconcile the known facts connected with this inquiry.

What, then, it may be asked, constitutes the difference between the products of ordinary inflammation and tubercle? It is, as may be demonstrated, the comparative inorganizable power of the latter. In tubercle we have granules and imperfect cells, in the products of healthy inflammation we have granules and perfect cells. Both these morbid products are formed by the exudation of blood-plasma. If it undergo transformations into perfect organisms, it constitutes what pathologists have in some cases called the results of inflammation, in others, different kinds of tumours. If these transformations are arrested or rendered imperfect, it forms what has been called tubercle or scrofulous deposits. The tubercular exudation, however, when broken down and rendered molecular, is capable of being absorbed, in the same manner as the product of healthy inflammation. This often occurs. But as the rapidity of the molecular disintegration of exudation is dependent upon its power of growth, so this change must take place in tubercle more or less slowly, according to its organizable powers. The essential distinction, then, between the products of inflammation and tubercle must be sought for in a difference of composition, (chemical and vital,) in the blood-plasma of which they are each composed. Hitherto chemistry has not taught us in what this difference consists, but has pointed out the probability of its being composed of some form of proteine less capable of passing into organization than fibrin. The deficiency of organization itself is easily demonstrated by the microscope, and may often be seen in textures where lymph and tubercle gradually pass into each other.*

As there is nothing, then, in the nature of tubercle itself which opposes the anatomical evidences previously described, the fact of the frequent spontaneous cure of tubercle may be admitted. On looking over the works of our greatest authorities on this subject, I find that the occasional curability of the disease is admitted by all. Lanenec, Andral, Cruveilhier, Kingston, Pressat, Rogée, Boudet, and many others, have published cases where all the functional symptoms and physical signs of the disease, even in its most advanced stage, were present, and yet where the individual survived many years, ultimately died of some other disorder, and

* A series of preparations was exhibited to the Society, where, in various textures, lymph so closely resembled tubercle as not to be distinguished from it.

on dissection, puckerings and concretions have been found in the lungs. Rokitsanski observes that pulmonary phthisis is without any doubt curable, (*heilbar*.)

Rogée tells us that Broussais himself, during the early part of his life, complained several times of feeling something at the apex of the right lung, which induced him to think that tubercles existed in that situation. When examined after death, there was found at the summit of the right lung, a strong adhesion with the costal pleura. Here also the lung was puckered, and on incision a small cretaceous mass, surrounded with dense and black parenchyma, was observed.

Boudet, in the memoir already referred to, says that in one year he met with fourteen cases where softening of tubercular matter in a cavern was evident, all traces of which subsequently disappeared. Rogée refers to many others. Dr Stokes says that in a few cases even after excavation has formed he has seen a recovery. For a confirmation of this point, indeed, I may safely refer to the experience of old practitioners, many of whom have described to me several cases where all the symptoms of phthisis were present, which ultimately recovered. So deeply rooted, however, has been the opinion of the necessarily fatal nature of this disease, that, not being guided by auscultation, and simply *because* they recovered, it was concluded that the disease was *not* phthisis; that is, they have rather distrusted their own diagnosis than ventured to oppose a dogma of universal belief.

The treatment of pulmonary consumption has for the most part been conducted on strictly empirical principles. One vaunted remedy has succeeded another; they have all been tried and found unsuccessful. The pathology of the disease readily explains this circumstance, as no one remedy can be useful in a disorder that, from its commencement to its termination, presents such different characters and indications. These characters and indications are only to be ascertained by a practised auscultator, and the signs which guide his practice are totally inapplicable to others who cannot distinguish them. Now, as empirical means for accomplishing a cure have notoriously failed, perhaps a study of the method in which nature operates may be more successful. The facts which have been brought forward certainly hold out every encouragement for prosecuting a rational treatment based on its general pathology. Rokitsanski observes,* “Researches into the circumstances under which a natural cure takes place, is the only method by which we may expect to arrive at a rational mode of treatment, as it must be directed not against the pulmonary ulcerations, but against the general tuberculosis.”—Hence a

* Handbuch der Path. Anat. Band. iii. s. 148.

knowledge of the progressive march of tubercular depositions towards a cure is of permanent importance, and would seem, from the observations I have made, to take place in the following manner.

At first tubercle is deposited in a fluid state from the capillaries in the same manner as lymph. The miliary and infiltrated forms, whether gray or yellow, after a time soften,—a process which may commence at any part of the mass and gradually affect the whole. We generally find that the parenchyma of the lung or the pleura in the immediate neighbourhood of such deposition is more or less inflamed, indurated, and thickened. The pleura especially is almost always affected, and in such cases reaches a thickness and density unknown in other diseases. The parenchyma is also rendered dense, and produces a thick indurated capsule all round the tubercular deposit, which is frequently of semicartilaginous hardness, and so firm as to retain its form even when the softened tubercle has been evacuated by expectoration through the bronchi. This gives rise to the dry blowing sounds often heard over such cavities. If the destruction of the organ be not carried to such an extent as to cause death, and if the further depositions of fresh tubercle can be checked, the cavern gradually contracts, its walls unite or close upon tubercle which has undergone transformations to be immediately described, and a cicatrix is formed.

Cicatrices present different appearances, according as the cavity from which they are formed was superficial or deep seated. In the first case it will generally be observed that the pleuræ are more or less adherent and thickened, and this frequently forms an external boundary to the tubercular cavity. As the matters which it contains are expectorated or transformed, the lymph gradually contracts, draws the lung closely to the thoracic walls, from which it cannot be separated without great violence. More frequently, however, the cavity is deeper, and the adhesion very slight, or does not exist. In this case, when the walls of the cavern contract, the pleural surface of the lung is drawn inwards, and in this way the irregular puckerings visible on the surface are produced.

Sometimes no traces of tubercular matter are discovered either within or in the vicinity of these cicatrices. Under such circumstances they appear to be formed of dense fibrous tissue, and the parenchymatous substance in their vicinity is of a bluish-black colour, from increased pigmentary deposit and of peculiar induration and density, owing to chronic inflammation. More generally, however, the contraction and puckering will be found to have occurred around tubercle, which has undergone various transformations. Occasionally there are round masses of crude tubercle surrounded

by a cyst. They are of unusual density, still of a yellowish colour ; but contain granules of earthy salts more or less numerous. Often they are white and friable, resembling chalky matter. In this state the soft portions have been apparently absorbed, and the whole consists, under the microscope, of irregular masses of earthy matter, mixed with numerous granules and crystals of cholesterine. At other times the whole has been converted into a solid calcareous mass, frequently round, at others having numerous prolongations and irregularities, which accurately fit the surface and bronchi with which they are in contact. These cretaceous and calcareous concretions may remain an indefinite time in the parenchymatous substance of the lungs, or they may be evacuated through the bronchi, and are then found among the sputa. The cyst which incloses them then forms a cellular or dense linear cicatrix.*

Such appears to be the mode in which tubercular ulcers heal. They occur in exactly the same manner as abscesses in other parenchymatous tissues, the result of simple inflammation ; and that the process in both is identical, is proved by the frequency with which in the latter calcareous deposits also take place.

If, then, the further deposition of tubercle could be arrested, there seems no reason why cavities in the lungs should not heal with the same frequency as ulcerations or abscesses in other internal organs. This is only to be accomplished by overcoming the pathological conditions on which the deposition of tubercle depends. These are, *first*, a morbid state of the blood, the result of imperfect nutrition, *second*, local inflammation by means of which an unhealthy exudation is poured out, that assumes the form of tubercular or scrofulous matter.

I forbear entering upon the theoretical considerations which the nature of this imperfect nutrition naturally suggests. It is perhaps sufficient to say, that chemical, morphological, and physiological facts unite in pointing out that it is attributable, first, to an excess of oxygen in the system which combines rapidly with the tissues to produce waste, and to occasion acidity in the alimentary canal ; and secondly, to an excess of nitrogenized or albuminous and a deficiency of carbonized or oleaginous matters in the chyle, blood, and tissues generally ; the liver, the great emunctory of fatty and carbonized matter, excepted.

I need not more especially allude to the fact, that all the local symptoms and physical signs are identical with those of inflammation, they only differ with respect to their more frequent situation in the apex, instead of at the base of the lung.

* A series of preparations was exhibited, showing all these different forms of cicatrices and the various transformations which tubercle undergoes. Also portions of calcareous matter expectorated with the sputa.

The indications for treatment, therefore, are *1st*, to overcome the dyspepsia and acidity in the alimentary canal; *2d*, to furnish the material necessary for the formation of a healthy chyme; and *3d*, to combat the local inflammation.

The principal difficulty in the treatment will be found to consist in removing, at the same time, general imperfect nutrition and debility, together with a local inflammation and the irritability dependent on it.* The dyspeptic symptoms frequently continue throughout the disease, they often become uncontrollable, and the extreme irritability of the mucous membranes is evinced by vomiting, diarrhoea, bronchorrhoea, and laryngitis.

These symptoms with the dyspepsia are frequently to be alleviated by naphtha, when all ordinary means have failed. The boasted good effects of this remedy are I think attributable to its great power of allaying the irritability of the stomach, and thus enabling the patient to take nourishment.†

The imperfect nutrition will be best overcome by an easily digestible and nutritious diet; milk; substances abounding in oleaginous rather than albuminous principles, and an equable warm climate, whereby, in conjunction with the diet, the excess of oxygen in the system may be diminished. In following this second indication, I can now, after four years' employment of it in private as well as in dispensary and hospital practice, strongly recommend cod-liver oil as a most valuable remedy.‡

The local inflammation must be combated by topical blood-letting in the first stages, as leeches and cupping. (Dr Graves as strongly recommended mercury, to cause absorption of the exudation.) In the latter stages, by counter-irritation, especially stimulating embrocations, tartar-emetic ointment, blisters, and the moxa.

It were easy to dilate upon the mode of employing these differ-

* This point has been ably treated by Dr Evans of Dublin.—Lectures on Pulmonary Phthisis.

† I have now given naphtha, first recommended by Dr J. Hastings, to several phthisical cases with great benefit. In three cases at present in my female ward in the infirmary, it immediately checked the vomiting after every other remedy had been found useless. One of these individuals had vomited after every meal, and whenever the cough was urgent, for a period of four months. This symptom ceased after two doses of the following mixture, and she is now improving under nutritious diet and cod liver oil.

R. *Naphthæ medicinalis*, ʒss.; *Tr. Card. c.* ʒi; *Aq. Camphoræ*, ʒv. *Mist. Capt.* ʒss. *ter die.*

‡ Large quantities of cod liver oil are now made in Edinburgh and Leith for medicinal purposes, and its consumption is very great. It is of considerable purity, nearly tasteless, and may now be procured at all the respectable druggists in this city.

Since the publication of my Treatise on the Therapeutic Properties of this substance, its value in *Phthisis pulmonalis* and *Tinea favosa* therein spoken of, has been confirmed by Dr Peyreya of Bordeaux. With his experience of its benefit and its general effects, mine entirely coincides. See a little brochure, "*Du Traitement de la Phthisie Pulmonaire, par 'Emile J. Peyreya, Médecin Titulaire de l'Hôpital de Bordeaux,*"—a work worthy the perusal of every practical physician.

ent remedies in order to carry out the indications enumerated. Some of course are more valuable than others, and all demand tact and experience, guided by a perfect knowledge of the physical changes which take place in the lungs. The different stages of the disease also will of course require the one or the other indication to be followed with greater activity. But I think experience will prove that whenever treatment has been beneficial in phthisis, it will be found to have occurred from its having, either by design or accident, been so directed as to meet the pathological conditions pointed out. One thing at least is certain that they can never be overcome by a blind adherence to one particular remedy.

I have had numerous opportunities of seeing individuals among the poor population still carrying on their work with large caverns in the lungs. Many of these I have seen improve on entering a hospital, or on the occurrence of circumstances which have bettered their condition. I have collected a few which, under the treatment recommended, have apparently undergone a complete cure. But as a few cases, in a matter of so much importance, are quite inadequate to establish the possibility of cure by therapeutic means, I shall not allude to them at present.

Whatever opinions may be held, however, with respect to the value of the indications and treatment proposed, it will perhaps be conceded that the facts now brought forward are sufficiently important to warrant renewed trials directed to the curative rather than the mere palliative treatment which is now so prevalent.

PART II.

CRITICAL ANALYSIS.

ART. I.—1. *Medical History of the Expedition to the Niger during the years 1841–2, comprising an Account of the Fever which led to its abrupt Termination.* By JAMES ORMISTON M'WILLIAM, M. D. Surgeon of H. M. S. Albert, and Senior Medical Officer of the Expedition. With Plates. London, 1843. 8vo. Pp. 287.

2. *Some Account of the African Remittent Fever which occurred on board H. M. Steam-ship Wilberforce on the River Niger, and whilst engaged on Service on the Western Coast of Africa ; comprising an Enquiry into the Causes of Disease in Tropical Climates.* By MORRIS PRITCHETT, M. D. F. R. G. S. Member of the Royal College of Physicians, London, and late Surgeon of H. M. S. Wilberforce. London, 1843. Post 8vo. Pp. 184.

It had been long known that in the west of the large Continent of Africa, a river of considerable and progressively increasing size flowed, according to some authorities westward, according to others in an easterly direction, towards the centre, apparently, of that arid region. The course of this river, however, and its termination were altogether unknown, and continued to be the subject of conjecture, speculation, and supposition, for a great part of last century, and one-third nearly of the present century. A matter of such high importance to correct geographical knowledge was calculated not only to attract attention, but to give rise to efforts capable of, or at least tending to the solution of the problem; and, accordingly, it early became an object of great and increasing interest to scientific inquirers in this country, and upon scientific grounds alone. A number of scientific persons, accordingly, who took interest in the rectification and extension of geographical knowledge, formed themselves, in 1788, into the African Association, for the purpose of adopting the best

means of exploring the interior of that Continent, for the elucidation of its geography, and especially with the view of obtaining correct information on the course and termination of the Niger, and the countries and towns which it visited in its course. Among the members of this association were Sir Joseph Banks, Major Rennell, Bryan Edwards, Sir William Young, and others not less distinguished for knowledge and enthusiasm in the cause of science.

All the desires, however, thus created might have terminated in unavailing wishes, had not one man arisen, who, with the most insatiable curiosity to visit this little known country, and the most enthusiastic ambition to determine the question as to the course and termination of the river, united a high degree of physical energy, firmness, and indefatigable perseverance. Mungo Park* was probably the first European who looked on the waters of the Niger; and, by his first expedition in 1795-96, it was positively determined that about 200 miles from the west coast of Africa, a large river pursued a course eastward along the northern side of the Kong range, as far as a considerable town named Silla; and, by the second expedition in 1805, he traced the same river as far as Boussa.

Curiosity, however, was thus only excited not gratified; and, on the facts ascertained by Park, various speculations continued to be raised. By some, as by Rennell, it was believed that the Niger lost itself into some large lake in the interior of the Continent. Some imagined that it was swallowed up in sandy deserts. Some fancied that it pursued its eastward course and fell into the Nile. And some, like Mungo Park, imagined that it must convey its waters to the Atlantic, somewhere on the western coast south of the equator. Park after his first journey believed with considerable confidence, that the Congo was the lower outlet of the Niger. As this implied that it must, by some route or other, have got to the south of the great Kong range, and must have changed its original direction, it was further inferred that a large chasm or gap must have been formed in these mountains, and that this was the channel by which it found its way to the ocean.

This last opinion was not subjected to the test of experiment until after the lapse of several years. In the year 1816, when we began to breathe from a long period of bloody and expensive warfare, Captain Tuckey† was sent out to the west coast of Africa, to explore and trace the course of a large river, known under the names of

* The Journal of a Mission to the Interior of Africa in the year 1805. By Mungo Park. Together with other Documents, Official and Private, relating to the same Mission. To which is prefixed an Account of the Life of Mr Park. London, 1815. 4to.

† Narrative of an Expedition to Explore the River Zaire, usually called the Congo, in South Africa, in 1816, under the direction of Captain E. Tuckey, R. N. To which is added the Journal of Professor Smith; some general observations on the

Zaire and Congo, and determine whether it was not identical with the long sought Niger. The experiment proved in several respects a failure, not from any want of skill or courage in the commander or his crew, but from the natural and necessary dangers of navigation on African rivers, and the extreme unhealthiness which that labour causes to Europeans. The greater part of the crew were speedily attacked with fever or dysentery, or both; much mortality followed, and they were compelled to abandon the enterprise after they had advanced 240 miles up the river. Among fifty-four persons who went on this expedition, twenty-one persons died within three months. The disease was usually remittent fever of a very violent form, so rapid that, in many cases, death took place on the third or fourth day. From this expedition two facts were learnt; the first, that the Congo or Zaire could not be and was not identical with the Niger or Joliba; and the second, that the west coast of Africa and the banks of the rivers, terminating on it, were so deleterious to the European constitution, that little hope was held out of its ever being practicable for European crews to attempt the inland navigation of these rivers. We shall afterwards see how far this last conclusion has been confirmed by subsequent experience.

It might doubtless have been alleged, and we believe it was thought, that the calamitous termination of the expedition of Captain Tuckey was not necessarily connected with the expedition, but with the mode in which it was undertaken and conducted. It might be argued and was argued, that the slow progress of a sailing vessel, aided only by occasional rowing in boats up an equinoctial river with a forcible current, was, on the one hand, a tedious and lengthened business, and, on the other, must have so much fatigued the men, that these circumstances alone were sufficient to have induced fever; and that had the ascent been attempted and executed by the gigantic and unwearied agency of steam navigation, many, if not all the evils might have been avoided.

This objection was in some degree foreseen, though not anticipated, in the case of the Congo expedition. It was originally intended that the vessel destined for the ascent of the river, should be not only constructed so as to be suited for passing the shoals and shallows of a river, but should be propelled by steam. It was found, however, that when the steam-engine was placed in the vessel, she drew so much water that she could neither be serviceable in passing shallows, nor could she sail so rapidly as a sailing vessel. Her velocity, indeed, with the engine was reduced so low as four knots in the hour; and when lightened to the

draught of four feet three inches, her rate of motion never exceeded five knots and a half in the hour. This defect was fatal to her fitness for ascending the Zaire ; and the engine was accordingly removed.

It might still be argued that this was in the comparative infancy of steam navigation, and so assuredly it was. Our knowledge of the best mode of adapting steam-engines to vessels, especially for river navigation, was very imperfect ; and great improvements have since that time been effected. The steam vessels on the Thames can sail at the rate of sixteen miles in one hour, drawing at the same time very little water. In two subsequent trials, accordingly, these objections were completely obviated, and steam in its most efficient form was applied to ascend the branches of the Niger.

Meanwhile new interest had been taken, and new views had been formed on this curious question ; and what had originated merely in scientific curiosity, became identified and associated with two other objects of British enterprise, which gave a strong, decided, and concentrated impulse, to the different sentiments entertained on the subject.

These were the anxious desire to put a stop to the traffic in slaves on the West African coast, and the wish to open up to British mercantile enterprise the natural riches which were supposed to proceed from the regions of Central Africa. The conjunction of the three interests now mentioned,—scientific curiosity, the desire to suppress the traffic in the natives of Africa, and the hope of procuring a market for the products of British industry, were all conjoined in pushing forward the investigation as to the course and termination of the Niger, and, indeed, every thing tending to elucidate the geography of the interior of Africa. New adventurers crowded into the field ; and a series of ten years witnessed or heard of the successive travels, labours, hardships, and discoveries of Laing, Clapperton, Denham, and Richard and John Lander. At length it was the fortune of Richard Lander to solve the great problem. In an expedition, undertaken in 1830 at the expense of the British Government, Richard and John Lander sailed down the Quorra or Joliba from Yaoori, 100 miles above Boussa, and, in December 1830, found themselves on the Nun, one of its mouths or outlets in the Bight of Benin.

It was thus clearly ascertained that the river known to Ptolemy, Pliny, and the ancient geographers, as the Niger, and, in the dialects of Africa, as the Joliba or Quorra, pours its vast and multitudinous waters,—the drainage of half the African Continent,—into the Atlantic by a series of rivers opening in the Bight of Benin, extending from the river Formosa to that of Calabar, about 250 miles. These rivers or estuaries rather, are so numerous that they have exceeded the powers of navigators accurately to distin-

guish, number, and name them. It was only known that they formed creeks and estuaries, more or less large and extensive; and the largest only had been separately designated. These are, taking them in successive order from north to south, the Formosa or Benin; the Brass River, the Nun of the Portuguese; the Bonny; Old Calabar; Rio del Rey or King's River; and, according to some, Rio Cameroons. But the statement that the last is one of the outlets of the Niger must be regarded as doubtful, or rather positively erroneous, since the survey of that river in 1826 by Captain Boteler. These may be regarded as inclosing and intersecting an immense Delta, perhaps the largest in the world, with a coast base of 250 miles, and an inland extent of at least 160 miles, or, according to some, 170 miles; but, at the same time, from the flat and level character of the surface and the profusion of the waters of the Quorra itself, forming, for a long period of the year, an immense tract of swamp and watery waste.

Since the period of the discovery now mentioned in 1831, it became a favourite object of the British Government to ascertain the commercial resources of this little known region, and, if possible, to open them up to British enterprise, and establish commercial relations, which might be beneficial to both countries. In pursuance of the views now mentioned, two steam-vessels, the Quorra and Alburkah, were sent out with the intention of sailing up the Niger, and by this channel exploring the interior of Africa. The expedition, notwithstanding the assistance of steam-navigation, encountered the usual evil fortune in the sickness and mortality which disabled and destroyed many of the crews; but it served to add fresh evidence, if that were required, to the facts ascertained by Richard and John Lander.*

In 1839 the Government again determined to attempt another expedition up the Niger, not only with the view of ascertaining the commercial condition and resources of the countries in the interior of Africa, but also with the purpose of suppressing effectually the traffic in slaves, the natives of the country,—an object which had hitherto, to a great extent, failed more or less completely. In September and October 1840, accordingly, three iron steam-vessels, the Albert, the Wilberforce, and the Soudan, were commissioned and fitted out at Liverpool. The Albert was commanded by Captain Henry Dundas Trotter, to whom also was assigned the supreme command of the expedition. The Wilberforce was commanded by Mr Commander William Allen and Mr Bird Allen.

In planning this expedition every precaution that former experience and scientific knowledge could suggest for maintaining

* Narrative of an Expedition into the Interior of Africa, in the Steam-vessels Quorra and Alburkah, 1832-33-34. By Macgregor Laird and R. A. R. Oldfield, Surveying Officers of the Expedition. London, 1837. Two vols. 8vo.

the health and vigour of the crews and counteracting the noxious effects of the climate was adopted; and all practicable means were taken to insure the ultimate success of the expedition. The supply of provisions and stores of the best quality was liberal and abundant; cordials, wine, and medicines also of the best quality were provided; and arrangements to insure effectual ventilation were made in all the vessels. The crews also of each were selected with peculiar care. In general they were men in the prime of life, neither too young nor broken down by age or previous hard labour. Most of them had previously served in warm or in tropical climates; and in all cases care was taken to make them understand the nature of the service on which they were proceeding.

After proceeding to the Thames and completing their stores at Deptford and Woolwich in March 1841, they returned in April to Plymouth as a general rendezvous previous to their departure from England.

At this period the composition of the crews in the respective vessels are shown by the following table:—

H. M. Ships	Officers in- clud. Civil. and Engin. Seamen.	White	Marines.	Sappers and Miners.	Men of Co- lour of var. Nations.	Total.
Albert	20	24	9	4	14	71
Wilberforce	22	26	9	4	10	71
Soudan	11	17	4	0	4	36
Tot. of each class and of whole	53	67	22	8	28	178

Among the officers attached to the expedition, was a staff of scientific observers, botanists, geologists, mineralogists, and lithographers, each of whom were understood to assist in their departments in collecting useful information and promoting the great objects of the expedition. The expedition was also provided with a staff of able medical officers, Dr M'William being surgeon to the *Albert* and principal medical officer of the expedition. To two of these, Dr M'William and Dr Pritchett, we are indebted for the accounts hitherto published of this expedition. Both are interesting and instructive narratives; both are evidently prepared with great care and accuracy. It is not easy to say which is the best; nor is this in any way necessary. Both have peculiar merits; and though the reader, after perusing Dr M'William's account, may think he has learned all that is requisite, he finds, nevertheless, many useful pieces of information in the narrative of Dr Pritchett. In the subsequent account we shall study to combine the information given by both.

The *Soudan* and *Harriott* transport, the latter laden with stores, sailed from Plymouth on the 17th of April 1841. The *Albert* and *Wilberforce* did not depart from England till the 12th of May.

On the 24th of June at day-break the summits of the Sierra Leone range were descried, and in the course of the same day the *Albert* was off Free Town. On the 16th July they were off Cape Palmas; and on the morning of the 19th they arrived at Cape Coast Castle. The *Wilberforce* arrived on the 26th July. Here they remained till the 30th of July, in the evening of which the *Albert* and *Soudan* sailed and next day anchored off Accra. On the 4th of August they again weighed anchor; and on the 10th all the vessels, including the schooner, the *Amelia*, which joined the expedition at Sierra Leone, and the *Harriott* transport were anchored within five miles of the Nun branch of the River Niger. The squadron had therefore now arrived at the ground at which their principal labours and investigations were to be commenced. Henceforward the proceedings of every day were invested with new and peculiar interest. And not only were they hoping to add much to the knowledge collected of the interior of Africa and the countries watered by the Niger, but they were preparing to encounter dangers, not the less formidable that they were with certainty expected.

On the 13th of August 1841, at half-past 7 in the morning, they commenced the ascent of the Nun branch of the Niger by the *Albert* steaming over the bar at its mouth, followed by the *Soudan* and *Amelia*. The *Wilberforce* crossed the bar on the 16th; and only at daylight on the 20th began to ascend the river. The breadth of the Nun at its mouth is about three quarters of a mile. Viewed about one mile from the mouth, it presents a broad stream flowing smoothly until lost in the sea. Each point of the entrance is bordered by a white sandy beach of considerable extent. A little way up the vegetation is dense and luxuriant, and resembles a dark uniform level mass resting on the surface. On nearer approach its characters become more distinct, especially on the left bank, where the palms skirt the shore, and vary a little the dark gloomy mass of vegetation behind.

The banks of the mouth of the Nun are from one foot and a half to two feet above the level of the river; and even this moderate elevation extends very little from the river, for all behind is flat and swampy. A short distance up the river the banks are broken into lagoons and creeks, the edges of which are profusely covered with mangroves. Small bays even are formed by the sea running into them during the flowing tide, and these abound with crocodiles and multiplied races of reptiles, while the mangrove roots are covered, as in all other places, with numerous shell-fish and various forms of mollusca. During low water a disagreeable odour was perceptible in some of the lagoons entered by Dr M^r William and Dr Stanger; but the most delicate tests gave no evidence of the presence of sulphuretted hydrogen in any of the waters.

On the 19th August the Albert and Amelia began to ascend the river ; and next day, as already stated, the Wilberforce and Soudan followed. At Alburkah Island, the river, which here varied in breadth from three quarters of a mile to one mile, expanded at once to a sheet of water 4000 yards broad by micrometrical measurement. As they advanced upwards the palms increased in number ; the mangroves were growing in dense thickets to the water's edge ; large grasses and juncas were abundant ; and plantains of large size were observed. Often they were so close to the banks that the yards rustled among the branches ; vegetable matter, including trunks of trees, were seen floating down the stream in considerable quantity. About half-past one on the 20th they reached Sunday Island, about sixteen miles from the sea. Above this the mangrove ceases to grow ; neither does the water of the river give evidence of the presence of chlorides, and little or no salt was found on evaporation. Here again reeds, bananas, plantains, the bamboo, the palm-oil tree, the cocoa-nut tree, and the mimosa were the prevalent vegetable products ; and occasional plantations or cultivated spots were visible, intersecting the forest by which the banks of the stream are clothed.

The temperature of the atmosphere was 82°, that of the river 82° 20'.

At ten A. M. on the 21st they passed a branch of the river leading to Benin ; but whether the branch known under the names of Benin and Formosa is not stated. As they passed, on the 26th, a spacious branch leading to Benin, it is most likely that this and the other two all contribute to form the Benin or Formosa outlet. About one P. M. they passed Injiamma, or, as Dr Pritchett calls it, Indiamma, a considerable village on the left bank ; and one hour afterwards, another branch, leading, it was supposed, to Benin. It is possible that the two streams united lower down. They next passed a large village on the same bank, Atchaimanna ; and after this the banks appear to have presented a series of villages, several of which were surrounded by water.

Near Stirling Island, at which the Albert arrived at noon on the 25th August, the river increases in width ; but its banks were only from four to seven feet above the level of the river. On the following day, after passing a large branch going to Benin, the main stream is represented to be upwards of one mile in breadth. Here also the banks presented not only palm-oil trees, cocoa-nut trees, and bamboo, but plantations or cultivated spots producing plantains and yams. They were now more than 100 miles up the river, and were approaching the town of Ibboe or Eboe. On the evening of the 25th, the Wilberforce anchored off the creek leading to this town, and the following day, at 4 P. M. the Albert reached the same spot. They appear to have been well received

by the natives, who came off in their canoes in great numbers, and were much pleased as well as surprised with the appearance of the vessels.

The temperature of the atmosphere at this point was $80^{\circ} 5'$; that of the river $82^{\circ} 5'$.

Ibu, Ibbœ, or, according to Dr M'William, more properly Aboh, or Eboe in the orthography of Dr Pritchett and the majority of writers, so named, it is said, from its proximity to the waters, stands in latitude $5^{\circ} 48'$ north of the equator, and longitude $6^{\circ} 34' 30''$ east. It is situate on the right or north-west bank of the Niger, 120 miles from the sea, and about 40 miles below the apex of the Delta. From the river a creek about one mile and a quarter long extends. The outer, that is, we infer the peninsular part of the creek, is formed by a narrow strip of land covered with tall grasses and clumps of bush, completely overflowed with water. On landing, Dr Pritchett says they had to wade through flags, mud, and swamp. Yet here were built some neat-looking huts, most of them built in quadrangular groups, with an open court in the centre, in which cooking and other domestic processes were carried on.

Leading from the main creek or estuary, lateral branches diverged to the town, reaching the huts during the rainy season, and often inundating them. Here, also, that is in Eboe, the arrangement most usual was the quadrangular, with a central court with verandahs in front and on each side of the square. The huts were in general raised some feet above the level of the ground, either by means of an elevation of clay, or by strong wooden pillars from six to eight feet high. In the latter case, the access is by a ladder leading to the principal aperture. All of them seemed clean and well matted.

On the 27th of August, when it was visited by Dr M'William, Dr Stanger, Dr Pritchett, Mr Marshall, and the Rev. Mr Schoen, the chaplain, the place was completely submersed, and they were obliged to walk through the streets with the mud and slime up to their knees.

The number of huts in Aboh is estimated by Laird at from 800 to 1000. The town forms the capital or metropolis of a sort of kingdom or district situate mostly on the right bank of the Niger, and which is under the dominion of a monarch, named at that time Obi. The following account by Dr M'William gives a correct view of the customs of this black monarchy.

"Human beings are occasionally offered in sacrifice at Ibu. Twins are in all cases put to death, and it is said that children who cut their upper-jaw teeth first were instantly destroyed. Obi is said to be respected or feared throughout the lower Niger. His appearance is certainly prepossessing; he is upwards of six feet high, and stout in proportion; his forehead is large, and his countenance

generally indicates acute perception ; his features, with the exception of his nose, which is large, slightly snubbed, and flattened, are well formed ; his hands were small, and his feet well arched. He had a great quantity of red pipe-coral round his neck, wrists, and ankles ; his dress was wholly of a scarlet colour, but I must leave a more particular description to another narrative, which will in due time appear. An instance of his firmness was shown one day on board of the *Albert* : while he was engaged with the commissioners, I was amusing his brother and some of the Headmen by performing some experiments with Smee's galvanic battery. Obi came up to us just as the instrument was fitted for giving shocks ; Amorama the judge, a little man, touched the cylinders at the end of the conductors, and as the battery was at the moment acting rather powerfully, he dropped them with rapidity, and would not again come near. Most of the others looked upon this new and extraordinary agent with suspicion and awe ; even Obi himself stooped somewhat doubtingly to take the shock, but he seemed determined to show no signs of irresolution or fear before his people. He took a firm grasp of the cylinders, and held them upwards of a minute, although I could perceive the muscles of the shoulders and chest in strong electric excitation. To his brother I presented an ear of wheat inclosed hermetically in a piece of glass tube, and desired the interpreter to tell him that it was one of the kinds of corn grown in the country of the white men. This information he said was so far good ; but he wanted to know how the corn got into the tube, seeing that there was no opening ; and received, with much doubt, the explanation, of the glass being melted by fire, and then moulded to any form. Another portion of tube containing water, and likewise hermetically sealed, excited his astonishment still more, and he could not be made to believe that anything so wonderful could be effected by other than supernatural power.

" The soil of Aboh consists of sand and clay, with vegetable mould. At Afgub, an island opposite Aboh, the upper end of which is parallel with the entrance of the creek, the soil contains more sand than clay, and a proportion of mica. This island was so overflowed when the expedition was at Aboh, that landing was effected with much difficulty. Yams are cultivated extensively on the island for the supply of the Bonny, Brass, and other traders, who resort to Aboh. Here, on the 27th of August, the height of barometer and thermometer were,

At 11 A. M.	30°176
At noon	30°100
At 1 P. M.	30°139
Thermometer	79°000

Thermometer buried three feet under-ground
for three hours 79°500"—Pp. 63-65.

They had occupied seven days in ascending from the mouth of the Nun branch to the town of Aboh or Ibu, and hitherto they had sustained apparently no evil from the river or its banks.

They now proceeded, on the 28th of August, to continue their further ascent of the river. At 5 P. M. they passed a branch on the left or south-east bank, we presume, going to Bonny; and on the 30th they passed several villages, in the neighbourhood of which the cultivation of yams, bananas, and plantains was nearly the same as in the neighbourhood of Aboh.

On the 31st, at eight in the morning, as they were proceeding upwards, approaching the kingdom of Iddah, they observed a large crocodile, and afterwards several others basking in the sun at the edge of the river. The banks were here more clear and better defined, about three feet above the level of the river, and high land was distinctly seen to the north. In the evening they were off a town named Damagu, on the left bank, in the kingdom of Iddah, where the huts were of a circular shape, and where the river had encroached so much, as to inundate and render many of them uninhabitable. At this place, Dr M'William observes, Mr Macgregor Laird lost many of his men from fever.

The sunset of this day, the 31st, is observed by Dr Pritchett as being of the most magnificent character. "The grandeur of the great orb of day declining behind the deep verdure of the banks of the Niger on the one side, and its rays bringing out, in every variety of tint, the huge silk-cotton, and other trees of the opposite shore reflected in the still waters beneath may be imagined." Here, indeed, the Niger is expanded into a broad stream of upwards of one mile, and in some places one mile and a half; and it is not difficult to fancy the natural beauty of so vast a mass of water winding its way to the Atlantic, beneath the tropical sun, and bounded on each side by the luxuriant productions of the equinoctial regions.

On the 2d of September, in their ascending course, they were at one hour past noon opposite to Lander's Islands, the surface of which, as well as that of the mainland, was completely inundated; and about half past four the red cliffs of Iddah were perceptible. These cliffs, which consist of sandstone, rise to the height of 60 or 70 feet (Dr M'William says from 140 to 185 feet) above the level of the river, present a sort of plain or flat surface at top, which is covered with numerous habitations interspersed with the usual vegetable products and trees,—the palm, the silk-cotton (*bombax*), and the gigantic baobab (*Adansonia digitata*). The river here varies from one mile to one mile and a half in breadth, and the rocky elevations on each side gave it some resemblance to the Rhine, according to the observation of one of the eyewitnesses.

The adventurers had now passed through the Delta, the apex of which is fixed at about 40 miles above Ibbo or Eboe, and 160 miles from the mouth of the river. This was believed to be the most dangerous part of the voyage, so far as the health of the

voyagers was concerned. No case of sickness, however, had taken place during the ten days of their transit of the Delta; and two persons on board the Wilberforce, who had been ill before entering the Nun, were rapidly recovering. They had, indeed, advanced quite through the Delta as far as Iddah, 222 miles, Dr Pritchett says 260 miles, above the outlet of the river in the sea, and no indications of sickness had hitherto taken place. The crews, indeed, of the different vessels were at this time in the best health, and the officers inferred that all danger was over. This conclusion, though natural, was destined to be most lamentably contradicted. The truth was, that the time had not yet arrived for the poison to operate. It had, however, been imbibed, and, when it began to show its agency, the effects were unequivocal indeed. Meanwhile, we shall notice shortly the account given of Iddah.

Iddah is situate on the left or eastern bank of the River Niger, in north latitude $7^{\circ} 6' 10''$, and longitude $6^{\circ} 43' 21''$ east. The cliff upon which the town is built varies in height from 145 to 185 feet above the level of the river, and consists of a rock of ferruginous sandstone horizontally stratified. To the southward, English Island and others, and to the north, Abokko Island were all overflowed; while the people were obliged to paddle in canoes from one hut to another. The shore on the right or western bank is for some space low and swampy. But the land behind rises into hills of considerable height, which appeared richly clothed with wood. From the anchorage, within 200 yards of the cliff, was seen a magnificent range of rounded and conical hills, and, at some distance, high table-land stretching from north-east to south-west, with a dense forest extending downwards, through which several streams were pursuing tortuous courses to the Niger, which they joined a little above the town of Iddah.

The immediately surrounding country here is represented by Dr Pritchett to present the aspect of the scenery in well-wooded parks in England, ornamented however with the trees and shrubs peculiar to the tropics. At a distance, he adds, was seen the lofty range of the Kong mountains, rising above the confluence of the Niger and Tchadda, here about 50 miles distant.

This corresponds not imperfectly with the previously ascertained position of the Kong mountains, and the Upper Niger or Joliba to the north of these mountains. From the observations of Park it results that the Kong chain extends from west to east, between the fifth and tenth parallels of north latitude, or lies between 5° and 9° north latitude; that the Niger or Joliba rises on its northern side in about 9° or 10° north latitude, and proceeds (first in a north-east direction) to 13° , Marraboo and Sego, and 16° , Timbuctoo and Cabra; that here it turns to the east and south, being known at the same time under the name of Quorra, as far

as the 9° or 8° of north latitude, where it finds its way through the Kong chain, and thence pursues the southward course into the Gulf of Benin. As then the adventurers were now on the Niger, in north latitude 7° 6' 10", it is not at all improbable that they were between fifty and sixty miles from the Kong chain, which, at this longitude, 6° 42' east, would be very nearly eight degrees north of the equator, and quite possible that their eyes might rest on the lower and nearer hills of that range.

The temperature was at this time 85° at the highest; 73° at the lowest.

Iddah consists of two towns, one of which belonged to Abokko, brother of the former Attah of Iddah, and is still called Abokko's town. The huts are of a circular form, well built of coarse brick, hardened in the sun, and mud, and are surrounded by verandahs; but they are small, dark, and gloomy—light being admitted only by a low, narrow door-way. The palace of the Attah or king consists of a series of circular huts, communicating with each other, and one or two quadrangular buildings in the middle of a courtyard, which is surrounded by a wall.*

The population, Dr M'William estimates at not less than 7000. The majority of the people are Pagans; but the Moalams upon the Upper Niger are said to have converted many of the upper classes to Moslemism. Circumcision is generally practised. The town is the capital or metropolis of the kingdom or district of Eggarra.

Notwithstanding the apparent discomfort of their habitations, the natives are represented to enjoy good health, and to suffer only from cutaneous diseases, the effects probably of uncleanly and negligent habits.

It is remarkable, that it was while anchored here that sickness began to appear among the crews of the squadron. Hitherto no case of illness had taken place. But now, on the 4th September 1841, fever of a most malignant character appeared in the crew of the *Albert*, and almost simultaneously in the other vessels, and ceased not to attack them till they had removed entirely from the river. It is important here to observe, that they had now been, if we reckon from the 13th August, when they first entered the Nun, twenty-one days in the river, and, if we reckon from the 19th August, when they began seriously the business of ascent, sixteen days. These circumstances deserve attention, because they show that the crews of the vessels had been exposed to the atmosphere of the river banks at least sixteen days, and that those of the *Albert* had been exposed about nineteen or twenty days. We

* It is remarkable that this term used for King or Ruler, accurately corresponds with one of the names used by the ancient Greeks to designate the paternal relation. *Αττα γέγονε*. Homer.

shall afterwards advert to the deductions to which these circumstances lead.

Meanwhile they persevered in the ascent of the river. On the afternoon of the 8th September the *Albert* and *Amelia* left *Idadah*, and, soon after, the *Wilberforce* and *Soudan*. They proceeded; but new cases of fever occurred in all the vessels. On the 10th of September they passed *Beaufort Island* at eleven A. M., and at five P. M., the same day, they were approaching the confluence of the *Niger* and *Tchadda*; and at sunset they anchored off *Adda Kuddu*, which is right opposite the embouchure or outlet of the *Tchadda* into the *Niger*. By this time many more were added to the sick list; one death took place on the 9th; and two others followed on the 11th.

Between the 12th and 17th September the time was occupied in selecting a site for a model farm; and *Stirling Hill*, an elevation on the right or west bank of the *Niger*, immediately above the confluence, having been selected as more salubrious than *Adda Kuddu*, the materials for the house and offices, and the agricultural implements were removed thither as soon as possible.

The sickness, however, continued to increase, and it began to be a most serious subject for consultation, what course ought to be pursued, either to stop the progress of the sickness or effect the recovery of the cases attacked. Dr M'William, accordingly, made a careful survey of the whole of the ships' crews, and found that among 145 whites on the books, 63 had been on the sick list, 7 had died, 2 were cured, and 54 remained still ill; and among 158 blacks, there were 6 on the sick list. This statement he on the 17th placed before Captain Trotter, with the recommendation that one vessel should be sent out of the river with all the sick, to proceed to *Fernando Po*, or if possible to *Ascension*, where, along with hospital accommodation, the sick might have the benefit of change of climate.

On the 19th of September, accordingly, the *Soudan*, under the command of Lieutenant Fishbourne, with 40 cases of fever on board, including 33 from the *Albert* and 6 from the *Wilberforce*, under the care of Mr Thomson, assistant-surgeon, steamed down the river in the afternoon. Immediately after this, however, new cases of sickness occurred both in the *Albert* and in the *Wilberforce*; and it became a question, whether the most judicious course would not be, to withdraw the whole squadron, except one vessel which might be left to prosecute the objects of the expedition. It was finally determined, in accordance with this view, that the *Albert* should be left to continue the ascent of the *Niger*, while the *Wilberforce* and *Amelia* should proceed downwards with all convenient expedition. On the 21st September, accordingly, the *Wilberforce* commenced the descent of the river, with a number

of sick on board (at least thirty-five in hammocks), among whom were Mr Foster, master; Mr C. Wakeham, purser; Mr Toby, mate; Dr Vogel, botanist; Mr Rosher, mineralogist; Messrs Simpson and Terry, clerks; Mr Bowden, purser, and Mr Harvey, master of the *Albert*; and Mr Collman, assistant-surgeon of the *Soudan*. Captain Allen and Mr Commissioner Cook were also unwell.

On the 23d September they were at Eboe, on the 26th within the bar of the Nun or Niger, and having cleared the river, they were at sea near Fernando Po on the 30th; and having arrived at the island on the 1st October, they there remained till the 9th, thence they proceeded successively to Prince of Wales Island, to St Thomas, and lastly to Anno Bon, where they anchored on the 27th. Anno Bon they left on the 5th November for Ascension, which they reached on the 17th, and by this time the people had completely recovered. To the details we shall advert afterwards.

A portion of land extending from the northern ridge of Mount Patteh downwards to Mount Soracte, a tract on the right or west bank of the river, about sixteen miles long and five miles broad, including Beaufort Island, had been purchased from the Attah, or monarch of Iddah, for the purpose of forming a settlement. Stirling Hill, which had been selected as the most favourable spot in a hygienic point of view, forms part of Mount Patteh, rises about 200 feet above the west bank of the Niger, and was already in a state of partial cultivation, producing yams, cotton, and a species of millet. Behind Stirling Hill rises Mount Patteh to the height of 1160 feet above the level of the river, forming an extensive elevated table-land, on which are built several villages. This situation commands a good view of the Niger and the confluence of that river with the Tchadda, the broad stream of which is seen flowing smoothly from the east. The land appears elevated in all directions. The distance of this spot from the sea is 272 miles. The soil consists of ferruginous sand, formed by the decomposition of the rock of Mount Patteh with vegetable mould.

Leaving, therefore, Mr Carr, the superintendant of the model-farm, and Mr Ansell, the gardener, with the agricultura servants and labourers at Stirling Hill, and several persons on board the *Amelia* to render assistance, the *Albert*, with her men and officers much reduced in number, proceeded on the 21st September up the Niger, if possible to reach Rabba. The only officers, indeed, under Captain Trotter, were Dr M'William and Dr Stanger. Above the confluence the land on the east bank was rounded and undulating; and the course of the river became more winding.

On the 22d, while they were advancing to Lilemu, six new cases; on the 23d two; and on the 25th five, were added to the sick list.

On the 24th, while they were continuing their upward progress, it was evident that the river was in flood, as many villages were seen completely inundated and deserted; while several canoes with goats and fowls for sale came alongside.

On the 28th they were approaching Egga, and anchored there the same afternoon. This place, which is described as a long straggling town, close on the river on the right or west bank, upwards of 340 miles from the sea, was formerly the seat of government of the Nufi or Nyffe people. In 1841 it was under the immediate government of Rogang, a native of this part of the Niger, but who is subject to Sumo Sariki, the Felatah king at Rabba, who is stated by Dr M'William to be one of the most powerful chiefs of Central Africa. The kingdoms of Kutum-Karaff and of Fundah lie on the opposite bank, occupying the triangle bounded on the west by the waters of the Niger, and on the south-east by those of the Tchadda.

The town of Egga Lander supposed to be four miles long and two broad. Mr Schon and Dr Stanger who visited it, estimated the population at not less than 8000. In September 1841 it was completely surrounded by water, and for miles in all directions the surface was completely submerged. On the shore opposite the town, that is we imagine on the east bank, Dr Stanger, after wading two miles from the main stream, was nearly up to the middle in water, where he reached a shea or butter tree, with a large trunk, not tall but umbrageous. "On the drying up of the morass behind the town," says Dr M'William, "after the cessation of the rains, pestilential effluvia are exhaled from the surface, and, according to the Moallams, create bad fevers, eruptive diseases and dysentery, proving fatal to great numbers of the inhabitants. The huts are packed close to each other; and the streets are so narrow as scarcely to allow two people to walk abreast. The accumulation of filth is thus favoured, and the stench of the town is horrible."

Most of the men seen by Dr M'William wore the tobe. Many of the Nyffee people were dressed in a loose gown or robe. They are represented to be in general tall and well-made; and the form of the head, the countenance, and the lighter shade of colour on the skin indicated, Dr M'William thinks, an intermixture of the Caucasian with the Negro race.

This inference seems by no means improbable, considering the facts ascertained by Clapperton, as to the Tuaricks, and other nations of Central Africa, evidently not of Negro character. It is not easy to characterise some of these tribes, save by the absence of the physical characters of the Negro race. It is probable, however, that they are of Arab extraction; a circumstance which derives high probability from the prevalence either of the Arab language

or of Arab words in many of the names both of places and things. Thus we have already adverted to the use of the term *Attah*, which corresponds perfectly with the same word—indeclinable—employed by Grecian and Roman authors, and which was said to be a Thesalian word. The truth is, that it is an Arab or Syrian term, and in all probability has been derived from the source now referred to. The same may be said of the name of the city *Rabba*, which, in truth, is common to the Arabs, Syrians, and Chaldees, signifying the city of the waters.

Though it was originally intended on sailing from the confluence to have proceeded as high at least as *Rabba*, it turned out that *Egga* formed the termination of the expedition. Between the time of leaving the confluence, on the 21st September, and their arrival at *Egga*, on the 28th September, in the short space of seven days twenty of the men had been attacked, and two had died. In short there were now scarcely enough of efficient hands to work the vessel; and if any unexpected accident had taken place, the consequences must have been dreadful. Captain Trotter was attacked on the 3d of October; and there remained to work the vessel and take charge, one white seaman, the sergeant, and one private of marines, Dr M'William, Dr Stanger, Mr Willie, mate, and Mr J. Huxley, hospital-attendant. Mr Willie was also now attacked, and speedily became delirious and unmanageable.

Another evil was, that, as the season was advancing, the river had already begun to fall. Dr Stanger found, by marks on the shore, that on the 29th September the water had fallen fourteen inches, and on the 5th October not less than three feet. The idea of proceeding to *Rabba* was therefore abandoned as impracticable and dangerous; and on the morning of the 4th October they weighed to descend the stream from *Egga*, and on the 5th they reached the village of *Eddogi*. On the 6th, when Dr Stanger undertook, with the aid of the only engineer who could move out of bed to work the engines, they arrived in the evening near the east bank, opposite to *Buddu*, a town of *Kakanda*, in $8^{\circ} 20'$, and about one-third down towards the confluence.

Buddu, which was visited by Dr M'William on the 7th of October, appeared to him to be a town capable of containing 3000 inhabitants. About noon the same day they weighed anchor, and proceeded downward as far as below *Muye*, where they anchored for the night. During that night and next morning two persons in the delirium of fever jumped over board; one was saved, the other drowned. The river was evidently falling rapidly, and often the depth was not more than one fathom, one and a half, and two fathoms, so that they were often obliged to stop, to avoid running aground. At six in the afternoon they anchored about six miles above the confluence; and resuming the descent next morning at

six, they were, at half-past eight, opposite Stirling Hill, the seat of the settlement.

Here, again, they found an inauspicious state of matters, the superintendent, gardener, and schoolmaster, being all ill. These it was thought right to receive on board the *Albert*; and after obtaining a supply of wood, and providing the *Amelia*, which was to be left at the confluence, with nine months' provisions, they resumed the descent of the river on the morning of Sunday, the 10th of October. On the afternoon of the 13th, when about 3 P. M., near Stirling Island, they were met by a steam vessel coming rapidly up the river, which proved to be the *Ethiope*, Captain Beecroft, who rendered every assistance to the sickly vessel, and preceded her next morning in sailing down the river. At 6 P. M. on the 14th, they were near the mouth of the Nun. On the morning of the 16th they crossed the bar without accident; and thence proceeded with the *Soudan* in company for Fernando Po, where they arrived on the 17th.

Mr Kingdon, the schoolmaster, died on the 13th, nearly opposite Aboh; and a marine died on the afternoon of the 16th. But with these two exceptions, and that of Mr Willie, who was approaching his end, and who died at Fernando Po, all the others were much improved under the influence of sea-air.

On the 21st of October Dr M'William himself became unwell; and only began to recover at the end of three weeks. During this time four officers and one marine died.

It is unnecessary to trace the course of the vessel to Prince of Wales Island, St Thomas, Rollas, Anno Bon, and Ascension, which they reached on the 28th of January 1842, and where twelve persons labouring under intermittent and dysentery, the consequences of the Niger fever, were discharged to hospital.

The Wilberforce had arrived on the 17th November, and was there at the time when the *Albert* arrived. No deaths had taken place; but the crew were generally in a state of improved health.

The Wilberforce, after re-establishing the health of the crew, and receiving several new hands at Ascension, proceeded to the Benin coast again in March 1842, arrived at Fernando Po on the 8th of April, and was afterwards employed for four months in surveying the Amboises Islands and Cameroon River. It was decided by Government early in summer 1842, that the expedition should be abandoned. It was requisite, however, that one vessel should ascend the river and ascertain the state of the model farm and its inhabitants; and this duty Lieutenant Webb, now in the Wilberforce, had volunteered to perform. He entered the Nun branch of the Niger on the 2d July 1842, and the Wilberforce reached Aboh or Eboe on the 6th, Iddah on the 10th, and after grounding once or twice, the confluence on the 18th day of

July. The time was occupied in re-embarking the people and farm implements till the 22d, when they proceeded downwards, towing the *Amelia*, and finally left the river on the 27th July 1842. Fresh attacks took place in consequence of this second upward voyage. All, in number eight, were attacked; in short, all the whites except Lieutenant Webb, and of those seven attacked, two died. On the 29th July 1842, the *Wilberforce* arrived at Fernando Po, and on the 18th September she finally sailed for England, where she arrived on the 16th November 1842.

It now only remains to look at the results of this expedition on the persons engaged in it. This cannot be done in a more clear or precise manner than by the following tables given by Dr M^cWilliam.

" **STATISTICAL ACCOUNT** of the Cases of FEVER that actually occurred on board *H. M. S. Albert*, (including *Amelia* tender and *Model Farm*), *Wilberforce*, and *Soudan*, while the vessels were in the Niger; showing also where the deaths took place.*

H. M. S. Albert, including Amelia Tender, and Model Farm.

Albert in the river 64 days.

Number of officers, white seamen, marines, and sappers	62†
Of whom were attacked with fever in the Niger	55, or 1 in 1·127
Died on board the <i>Albert</i>	9
" <i>Wilberforce</i>	1
" <i>Soudan</i>	1
" <i>Dolphin</i>	4
Merchant ship <i>Warree</i>	1
Died at Fernando Po Sick Quarters	6
Royal Naval Hospital, Ascension	1=23
Ratio of deaths in total number actualled	1 in 2·696
in number of cases	1 in 2·391
Men of colour of various nations entered in England	15‡
" attacked with fever in Niger	6, or 1 in 2·500
Blacks entered on the coast	76
" attacked with fever in river	0

* These tables are wholly irrespective of the ships to which the officers, seamen, &c. belonged. They are intended to denote on board of what ships they were first seized with fever: and in what ships, or where the deaths took place. Without some plan of this nature it would be impossible to convey a clear idea of the vital statistics of the expedition, seeing that at the confluence the distribution of the crews of the squadron was considerably changed.

† Adding Captain B. Allen, Mr Webb, mate, and William MacLauchlan, sail-maker of *Soudan*, who joined before the *Albert* left the confluence to proceed upwards, and were taken ill immediately afterwards; also Mr Kingdon, schoolmaster, and Mr Ansell, collector, who were received on board in a dangerous state from fever, when the *Albert* was at the confluence on her way out of the river, and deducting Lieutenant Fishbourne.

‡ Adding one received at confluence when the *Albert* was descending the river.

H. M. S. Wilberforce ; in the River 45 days.

Number of officers, white seamen, marines, and sappers	56*
Of whom were attacked with fever in the Niger	48, or 1 in 1-666
Died on board the Wilberforce	6
at Fernando Po Sick Quarters	1=7
Ratio of deaths in number victualled	1 in 8-000
Ratio of deaths in number of cases	1 in 6-857
Men of colour of various nations entered in England	7†
" attacked with fever in Niger	3, or 1 in 2-500
Blacks entered on the coast	39

H. M. S. Soudan ; in the River 40 days.

Number of officers, seamen, marines, and sappers	27‡
Number attacked with fever in the Niger	27, or 1 in 1-000
Died on board the Soudan	5
" Wilberforce	1
" Dolphin	4=10
Ratio of deaths in total number victualled	1 in 2-700
Men of colour entered in England	3
" attacked with fever in Niger	2, or 1 in 1-500
Blacks entered on the coast	18

Statistical Summary deduced from the above tables.

	Albert, &c.	Wilberforce.	Soudan.	Total.
Total number of whites	62	56	27	145
Cases of fever among ditto	55	48	27	130§

* Deducting Mr Ansell.

† Deducting the officer of colour received on board the Albert at Model Farm.

‡ Including Lieutenant Fishbourne, who joined her at the confluence before descending the river.

§ Names of those who escaped the fever in the Niger.

Albert. William Stanger, M. D., geologist, suffered afterwards from intermittent in England.

Theodore Müller, chaplain, left the river at the confluence.

Charles Hodges, sergeant marines, was frequently unwell afterwards from head-ach, but was a good deal relieved by ulcers breaking out in the legs.

Morgan Kinson, P. marine, died of gastritis at Fernando Po.

John Huxley, sick-berth attendant, had a severe fever seven weeks after leaving the river at Fernando Po.

William Lamb, mid-steward, ditto, ditto.

Archibald Yair, sick-berth attendant, left at the confluence in Soudan, and was quite well throughout.

Wilberforce. William Cook, commissioner, left the river in Wilberforce.

James N. Stange, lieutenant, (now commander) ditto, ditto.

Morris Pritchett, M. D., surgeon, ditto, ditto.

James F. Schon, chaplain, ascended to Egga in Albert.

T. R. H. Thomson, assistant-surgeon (now surgeon), left the river in the Soudan.

John Stirling, assistant-surgeon, left the river in the Soudan.

Walsh, carpenter's crew, left the river in the Wilberforce.

Douglas, mid-steward, ditto, ditto.

	Albert, &c. Wilberforce.	Soudan.	Total.	
Deaths among whites	23	7	10	40
Number of blacks .	91	46	21	158
Cases of fever . .	6	3	2	11

H. M. S. Wilberforce on her return to the coast in 1842.

Died of fever	1
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Wilberforce's second voyage up the Niger in July 1842.

Number of whites on board	8
Number attacked with fever	7, or 1 in 1-140
Deaths in number on board from after effects	2, or 1 in 4-000
Ditto in number of cases	1 in 3-500

Return of the Total Mortality stated under the respective Ships to which the Officers, Seamen, Marines, &c. belonged, from the time the Expedition left England to its completion.

	ALBERT, including the AMELIA, &c.				WILBERFORCE.				SOUDAN.				
	Officers, including Engineers.	White seamen, ma- rines, and sappers.	Kroomen, liberated Africans, &c.	Total.	Officers, including Engineers.	White seamen, ma- rines, and sappers.	Kroomen, liberated Africans, &c.	Total.	Officers, including Engineers.	White seamen, ma- rines, and sappers.	Kroomen, liberated Africans, and other Blacks.	Total.	Grand total.
Aver. complement,	21	37	88	146	21	36	49	106	11	19	21	51	303
Deaths from fever contracted on coast,	...	...	...	...	1	...	1	2	...	...	...	...	2
Do. in the river,	6	14	...	20	3	6	...	9	5	8	...	13	42
Accidents,	1	2	1	4	...	1	...	1	...	...	1	1	6
Other complaints,	...	2	...	2	...	...	1	1	...	...	...	...	3
	7	18	1	26	4	7	2	13	5	8	1	14	53

It thus appears that among a number of 145 whites, or persons of European origin, 130 were attacked with fever, mostly on the Niger; and of these 130 attacked, 40 were destroyed; and that only 15 persons of the whole 145 escaped having fever; several of these having afterwards ague or fever, or other disorders, probably the effects of the voyage. It also appears that among 158 blacks the cases of fever amounted to not more than 11; and of these none terminated fatally. In the summer of 1842, among eight persons who went up the Niger in the Wilberforce, seven were attacked and two died. The total number of deaths from fever caught on the river was 42, two having died from fever caught on the coast.

Of the other deaths, nine in number, six were from accidents, and three from other diseases.

There is thus a total mortality of 44 among 145 persons, or 30½ per cent. or 803 per 1000.

The disease which proved thus pre-eminently virulent and fatal was miasmatic fever of the remittent continuous type. It is well described by Dr M'William in the following terms :

"Precursory symptoms and mode of invasion.—There was little uniformity in the character of the premonitory symptoms, or in the mode of attack. A number of the patients were for twenty-four hours, and sometimes more, sensible of headach, often slight ; and some experienced painful scintillations along the spine, attended with a feeling of coldness before they considered it necessary to apply for medical assistance ; while in others the approach of the disease was announced by a sensation of weakness, and sometimes of burning heat in the epigastrium. Giddiness, lassitude, tremulous and foul tongue, with small quick pulse, and general oppression succeeded. The eyes looked heavy, were occasionally suffused, and the motions of the pupil performed languidly. On two occasions that came under my notice, the individuals were seized without any warning symptom, and were at once so overwhelmed as to be for a time deprived of motion and sensation.

"In general, however, some of the above-mentioned symptoms, varying in duration and intensity, preceded the accession.

"Character, course, and duration of the symptoms.—The accession was seldom accompanied by very marked shivering, yet previous to the period of vascular excitement, the patient usually experienced a sensation of coldness, and for the sake of warmth would fain have exposed himself to the rays of the sun. He would shortly express a wish to lie down, and would complain somewhat suddenly of increase of headach or giddiness, and intense heat of the skin, which had a dry parched feel, restlessness, intolerable nausea, and difficult breathing. The dyspnœa in several instances, particularly in my own case, was extremely distressing, and continued from one to four hours, until relieved by spontaneous vomiting, or the occurrence of diaphoresis. Headach was with some the prominent symptom during the hot stage, and the feeling was described as that of a cord being tightly girded round the temples. The thirst was very urgent ; the tongue was foul in the centre, moist, clean, or reddish, and invariably marked by indentations on the edges. The countenance was more or less flushed, the eye occasionally suffused and always looked wild. Pulse rapid but small, frequently feeble ; thirst urgent, bowels constipated, and urine passed often and in small quantity. There was in general tenderness of the epigastrium, sometimes acute, but often not discoverable unless upon pressure.

In some cases, coldness of the stomach was complained of some days before death. A subsidence of febrile action in general followed in from three to six hours, or at all events, the symptoms if continued beyond the latter period became much mitigated. Diaphoresis came on, the thirst moderated, and the signs of oppression in

a great measure disappeared. The principal complaint at this period was from the disagreeable odour of the perspiration, particularly in those cases that subsequently proved fatal. I was not sensible of this peculiarity in the smell of the perspiration in my own case, but I perceived it very distinctly in several others. The sweating continued until from eight to twelve hours had been occupied by the whole paroxysm. The patient, although considerably exhausted, expressed himself as free from all trouble, and the countenance also indicated improvement. This seemingly favourable change did not last long, for the accession generally returned in from six to ten or twelve hours. Occasionally the respite extended to twenty-four hours. In a few cases, there was a treacherous interval of forty-eight hours, in the early period of the disease; but these invariably assumed afterwards a low malignant type. The fever in them seemed to have rested only to give strength for a fresh accession.

"The accessions did not seem to observe any law of periodicity. They came on, disappeared, and returned at all hours of the day and night.

"The evening, however, was a more common time of accession than any other; in which case, after the cold sensation had passed the paroxysm generally ran through its stages in the course of the night, and had suffered a considerable remission by the hour of breakfast (eight) the next morning.

"In a few instances the remissions were as complete as in the interval of ague. These were, however, only exceptions to the general rule, for total absence of fever was indeed of rare occurrence during the course of the disease.

"I cannot say that the influence of critical days was at all apparent, further than if no material improvement was evident by the eighth or ninth day, the prognosis was then most gloomy. The patient became weak, irritable, and exhausted, and extremely restless. The remissions were most indistinctly marked; the skin was dry and constricted, the tongue parched, pulse small and irregular; the fever, in short, now assumed a low asthenic form. Occasional symptoms of mental aberration would appear at this period; the countenance pale and shrunk; but not unfrequently the patient would talk most rationally upon the state of his mind, so far as regarded his eternal happiness. In several cases this stage was wonderfully protracted, as in case 12.

"Local pain was seldom much complained of: indeed, with the exception of headach (often very slight) at the commencement of the paroxysm, there were several instances in which the patients expressed themselves as quite well throughout the disease, although this ultimately proved fatal.

"When the disease was about to take a favourable turn, the remissions became distinctly marked, and the intervals were lengthened. The countenance (the best criterion) assumed a natural expression, a certain look of convalescence, that one can only become acquainted with by experience and contrasting it with that indicative of a fatal termination. The skin became moist, the thirst di-

minated, the pulse was more voluminous and softer; the tongue gradually lost its tremulousness, and could be more easily thrust out of the mouth; it often continued a long time loaded, but the crust was less brown, and more moist, and seemed to have lost its firm attachment to the organ: at this period diarrhoea was by no means uncommon, and also a copious flow of urine, which latter was a very favourable symptom. A strong desire for food was expressed by most of the patients who had advanced thus far, and I had more than once cause to regret having gratified it.

"Such were the general characteristics of the fever as it occurred in the Niger; but the description is not to be regarded as applicable to all the cases, for, on board of the *Albert* alone, there were several in which there was neither complaint nor evidence of suffering of any kind. There was a disinclination to be spoken to, or to be in any way disturbed; and a listless expression of countenance, with a clammy skin, and small pulse. The periods of exacerbation were so feebly marked as to be scarcely perceptible: food and medicine were taken when offered, but seldom or ever was anything asked for, and the invariable answer to inquiries after their health was 'I am very well.' Constant watchfulness was the only appreciable symptom in these cases which all terminated fatally, seemingly from mere exhaustion. It would have been interesting to have ascertained the nature and amount of the organic lesions in these cases; but, unfortunately, circumstances did not permit any of the bodies being examined.

"*Contingent symptoms*.—Of the contingent symptoms the most prominent were delirium, yellowness of skin, and convulsions, affecting various parts of the body.

"*Delirium* was a very bad symptom in the fever of the Niger: of twenty-one cases in which it occurred fourteen died, of whom one was drowned by eluding his nurse, and jumping into the river. It was not uncommon for patients, whether affected with delirium or not, to be haunted by dreams of a frightful nature,—as of being drowned, stabbed, or falling from a precipice. In the worst cases the mental aberrations were expressive of some personal misfortune or unheard-of disease. The imposition of the slightest restraint was always a heavy grievance. In one case the patient constantly harped upon his being condemned to everlasting punishment; when reason for awhile resumed her authority he would express shame and contrition for previous misconduct. The most solemn promises to behave well, if left at liberty, were not unfrequently made, only to be broken, whenever an opportunity offered for the exercise of the cunning, so characteristic of this stage of the disease.

"*Petechiæ* or *sudamina* were not observed in any case. In two cases which proved fatal on the seventh day, livid blotches appeared on the feet and hands, and gradually extended to the chest and abdomen.

"*Yellowness of the skin* occurred in nineteen cases, thirteen of which were fatal, and the average day of the appearance of this

symptom was the ninth. The yellow colour was first seen in the conjunctiva, and afterwards extended over the face, arms, and the rest of the body. It was in general light, and did not appear after death in any case in which it had not existed during life.

"The fæces in these cases were generally of a bilious colour; the urine deposited a sediment, but its chemical qualities were not ascertained.

"*Convulsions.* In three of the fatal cases on board the *Albert*, the muscles of the pharynx and larynx were convulsively affected, preventing or much impeding deglutition. In two others, also fatal, the spasms were confined to the muscles of the abdomen and limbs. Mr. Loney, the assistant-surgeon of the *Dolphin*, the vessel that received the sick from the Soudan, at the mouth of the river, informed me that out of eight deaths, which took place during the passage to Ascension, there were two cases in which deglutition was at first difficult, and soon stopped altogether, and two others in which there were general convulsions, more especially of the extremities.

"In one case paralysis of both arms, from which the patient has not yet altogether recovered, supervened during the early period of the disease.

"Partial paralysis of the right arm occurred in my own case, four months after convalescence from the fever had been going on, and lasted about six weeks. One man, on board the *Wilberforce*, was placed on the list for paralysis in November, after having had fever in the Niger.*

"In no case was there the slightest appearance of 'black vomit.' Bilious vomiting was common in the early stage of the disease; and the attendant retching was very troublesome. Irritability of the stomach, although more frequent at the beginning of the fever, was by no means confined to this period, for it was observed to have occurred also during the height and decline of the disease."—Pp. 131-139.

As to the morbid anatomy of the disease the following account is founded on the inspection of eight bodies.

"*Head.*—In two cases where the head was examined, softening was found in the *corpus callosum* and walls of the ventricles. In one case there was a small quantity of serous fluid in the base of the brain, and an unusual proportion in the ventricles. The *dura mater* was always sound. The *pia mater* in one case red and injected. No subarachnoid effusion was observed.

"*Thorax.*—The contents of the thorax were in nearly all cases healthy in appearance. Adhesions between the costal and pulmonary pleuræ were found in one instance, with tubercular deposits in the lungs in the state of induration. In another, a cartilaginous state of the tricuspid valves, with serous effusion in the left pleural sac.

* Captain William Allen informs me that he suffered from partial paralysis, with wasting of one arm, for many months after an attack of fever which he suffered when in the expedition up the Niger with Lander.

“ Abdomen.—The peritoneum and its processes, as well as the surface of the intestinal tube, had in general a bilious tinge.

“ The stomach.—In several cases the stomach contained from one to five ounces of yellowish-green fluid. The mucous coat was invariably softened whether this fluid were present or not. In three cases livid patches were variously distributed over the inner surface of the stomach, becoming more distinct when the mucous tunic was scraped off, exhibiting stelliform nuclei in their centres. In two cases the livid marks were arranged in the form of parallel streaks. These pathological appearances were chiefly in the splenic extremity of the stomach and near the pylorus. In one case there was remarkable venous arborescence on the exterior of the stomach, attended with general engorgement of the portal system. Small points of ulceration were observed in three cases, and slight thickening of the mucous lining in one instance only.

“ Duodenum.—The lesions observed in the duodenum were of the same nature as those in the stomach, but much less marked. In one case the lower portion of this gut contained a yellowish secretion, of the consistence of mucus.

“ The jejunum was free from disease, and likewise the ileum, until within three feet of its lower end, where were observed softening of the mucous lining generally and livid spots. A series of small ulcerations were seen in four cases. In one the membrane was thickened, rough, and the ulcerations had nearly perforated the bowel; this case proved fatal by terminating in dysentery. The agminated glands of Peyer were distinct and enlarged in three cases.

“ Colon.—The colon was usually nearly empty. On these occasions a dark, bilious, pulaceous matter was found in this portion of the tube, but in small quantity only; it was viscid and tenacious, adhering to the mucous tunic: where lividity or ulcerated points were found at the lower end of the ileum, the same lesions were seen to exist on the arch of the colon. Softening of the mucous coat was remarkable in three cases. In that of the case of dysentery already mentioned there was softening of the tunic where it was not ulcerated, and induration and elevation round the edges of the ulcerated patches.

“ Liver.—The liver was congested in one instance; larger than usual in two cases. It was anemicus in two cases where the patients died early, and on two other occasions when death took place long subsequent to febrile action. In the latter cases this organ was of a pale gray colour, and had a dry appearance on being sliced. This condition was not confined to one lobe.

“ Gall-bladder.—The gall-bladder was distended with bile of the colour and consistence of tar in three cases; one of which was fatal on the third, one on the seventh, and the other on the ninth day. In another instance the gall-bladder was nearly filled with bloody bile. The man in this case died suddenly, many weeks after the fever had left him.

“ The enlarged condition of Peyer's glands, which is regarded by

Chomel and Louis as constant in the typhoid fever of France, occurred in three cases out of eight that were examined. In four cases, the subjects of which with one exception died early, slight ulcerations of the gastro-enteric mucous membrane were observed. This fact is worthy of attention, inasmuch as it would seem to imply that the cause of the river fever, in whichever way it is introduced into the system, induces an unhealthy action in mucous surfaces much more rapidly than even the low typhoid fevers of France. Chomel does not consider that ulcerations take place in typhoid fevers earlier than the twentieth day, when there is also softening of the mucous membrane around the follicles, or in that part of it which covers them. Louis found the patches of Peyer natural in twenty autopsies, made by himself, of yellow fever cases at Gibraltar during the epidemic of 1828.

“*Spleen.*—In one case the spleen was enlarged, soft, and breaking down under the fingers; in another enlarged, gorged with blood, but firm. This viscus was not altered from the normal condition in the other cases examined. The pancreas was not in any case otherwise than natural. The kidneys were mottled and larger than usual on one occasion. The bladder was in general collapsed. A case in which bloody urine was voided was not inspected.”—Pp. 143–146.

These effects now detailed in the different textures of the bodies of those cut off, show that it is in vain to look in the changes induced for the cause of the disease, or even the cause of death. These changes cannot be regarded as the cause of the fever; but they are to be viewed rather as the effect of the febrile action, whatever that be, on the different organs, and perhaps effected through the medium of the blood and the blood-vessels. Dr M^cWilliam properly observes, in reference to one of the modern theories on fever, that, though morbid changes of some kind were found in the mucous membrane of the bowels in all cases, none of these were constant, and therefore cannot be regarded as essential to the existence of the fever. He also allows that, in the cases examined, the morbid appearances were manifestly insufficient to account for death, and that we must therefore admit the existence and operation of some agency independent of local inflammation. He judiciously adds that the morbid appearances are so far valuable, that they account in a great measure for ailments that occur as sequences of the fever, weeks and sometimes months after febrile action has ceased.

These sequences, which are fully detailed in the following section, consist in acute or chronic inflammation of the bowels, colic, hematemesis and hæmorrhage from the bowels, dysentery, hepatic disease, and intermittent fever.

Both authors have undertaken a lengthened inquiry into the causes of the Niger or African river fever. One opinion which

has of late years been rather prominently brought forward, is that of Mr Daniel, professor of chemistry in King's College, London, who, from sundry facts, saw reason to ascribe the insalubrity of the African coast and rivers to the presence of hydrosulphurous acid gas, (sulphuretted hydrogen,) produced by the decomposition of the sulphates of sea-water by admixture with fresh water containing vegetable matter. These facts were the following. *1st*, Water taken up on the rivers and near the coast, when sent to England, or kept for some time in bottles well corked, gave distinct indications of the presence of hydrosulphurous gas in considerable proportion. *2d*, Water taken from the rivers of Africa a good way up, beyond the influence of sea-water, did not, when kept, or at any time, present proofs of the presence of sulphuretted hydrogen. *3d*, The copper on the bottoms of the vessels engaged in blockading the outlets of the rivers, which was found to undergo most rapid destruction, was covered with two sorts of coats, one black, the other green; the first was found to be sulphuret of copper, the second the subchloride of copper.

It was afterwards ascertained, however, that these facts require to be rectified and modified. *1st*, It was found by experiments performed during the expedition that water taken at the outlets of the African rivers and put in bottles, corked and sealed in the usual way, gave indications in the course of a few weeks of the presence of hydrosulphurous acid gas. *2d*, It was found that water taken from the same source and put into bottles hermetically sealed, did not, after the lapse of the same time or even much longer, it appears, give any indications of the presence of sulphuretted hydrogen, (p. 170, foot note.) *3d*, The water when newly taken up never gave evidence of the presence of sulphuretted hydrogen, (p. 171.)

From these facts Dr M'William considers the absence of the gas in question from the sea and river waters and incumbent atmosphere to be distinctly proved, and thinks that the production of the gas, when it does exist, is not the simple consequence of the contact of sulphates and organic matter, but that some kind of that decomposition of organic matter, which is known as putrefaction, must take place. To this he infers that the admission, at least partial, of the air in the case of the corked bottles, in all probability, contributes.

The idea, therefore, of sulphuretted hydrogen being the cause of this malignant distemper was abandoned as altogether untenable; and the most plausible doctrine after all, is the old notion of miasma or malaria, whatever that might be, or whatever might be its essential agent. We find, indeed, the same physical characters of the coast and surface, the same physical characters of the rivers, their banks and neighbourhood, and the same produc-

tions along the course of the Delta of the Lower Niger, which are remarked in all other unhealthy and febrile lands in the equinoctial regions, and we find them followed by exactly the same effects. All these have been already sufficiently noticed in our sketch of the ascending progress of the expedition from the mouth of the Nun to the top of the Delta and far above that point.

Both authors observe, apparently with some degree of surprise, that the crews of the vessels were perfectly healthy during the whole time of their progress up the Delta; and that it was only after they had completely passed through this dreaded region that sickness began to appear. "We find," says Dr McWilliam, "that the squadron was healthy until we were at Iddah, twenty-two days after entering the river." He subsequently adds, "it will be seen in the brief detail of the progress of the vessels through the Delta to Iddah, the Confluence, and afterwards to Egga, that we had traversed over, slowly, a country of a character recognised as eminently fertile in the production of fever," p. 177. "It is somewhat remarkable," says Dr Pritchett, "that although we entered the Niger on the 15th of August, anchoring inside the bar of the Nun, and refitting there till the 20th, when we steamed onwards, it was not until the 4th of September that the first case was put on the sick list," p. 121. "The fever, therefore, only made its appearance after the anticipations of all had contemplated security. We were under the impression that, having passed the Delta, which had been supposed peculiarly fraught with the causes of disease, we had in fact now entered a salubrious region. It bore every appearance of being so. The ground was elevated and must be free, it was presumed, from all the causes of mortality suspected to emanate from the swampy banks below," p. 121.

We must candidly say, that in all this we perceive nothing extraordinary, unexpected, or inconsistent with the idea that the fever had arisen from the exposure of the crews to the air of the Delta, in passing up the river. It is not to be denied, that numerous instances are recorded of boats' crews and individuals being attacked with fever almost the next day, or at least one or two days after going on shore, sleeping ashore on the west or east coast of Africa, in some parts of the East Indies, and in Batavia; but certainly the usual course is for the attack to take place some time after exposure. It appears as if a certain time were required to elapse after exposure; or that exposure requires to take place for some time, in order that the poison or malaria might operate fully. Thus in the case of the expedition to the Zaire, the illness did not affect the crews till between one month and six weeks after entering the river. The first genuine case from the river malaria appears to have taken place, on the 15th of August, in the person of Mr Tudor. This was about five weeks after entering the

river. After that, others followed in rapid succession, so as to destroy eighteen persons in the space of three months, from this cause alone. In this expedition the space of time which elapsed between exposure and the first appearance of symptoms was much longer than is usually observed.

The same or nearly the same results were observed on the voyage of survey, on the East coasts of Africa, by the *Leven* and *Barracouta* in 1822. The vessels entered Delagoa Bay on the 27th of September 1822; and, on the 1st of October, they landed for the purpose of seeing some hippopotami in the haunts which the animals frequented. On the 3d of October a body of thirty-two persons, men and officers, was despatched from the *Leven* in four boats to explore the rivers *Temby* and *Mattol*. This party returned on the 12th, having been absent eight days. On the 14th another party under the command of Lieutenant Boteler, with three midshipmen and twelve seamen in two boats, was sent to explore *Dundas River*. Meanwhile those on board the *Leven* appear to have been often on shore. The first case of fever took place in Mr *Tamba*, who was attacked on the 20th or 21st of October, and died on the 24th of October. Captain *Lechmere* was attacked on the 2d or 3d November; (he came from the observatory with fever on him on the 3d); and died on the 9th of November. On the 5th of November there were twenty persons ill on board the *Leven*; and on the 19th the number was thirty-five; at which time they returned to the bay in hopes that then no more attacks would take place, and those already ill would more rapidly and easily recover. On the 5th, Captain *Cutfield* left the *Leven* with a party of six officers and twenty-four seamen to explore the *Manice River*; and after ascending fifty miles they began to return on the evening of the 11th November. On the 18th the survey was completed, and the crews returned on the 19th to their respective vessels. On the 22d of November the *Barracouta* and *Cockburn* sailed out of the river and joined the *Leven* in the bay; and at this time on board the *Barracouta*, four seamen had died; and seventeen more were dangerously ill. On the 23d, Captain *Cutfield* was taken ill, the number of sick having increased to five officers and eighteen men, twenty-three in all; and two days afterwards six more were added, making twenty-nine persons in a crew of sixty. On the 24th, when the vessels moved off to the anchorage off *Elephant Island*, one seaman died in the *Leven*, one boy in the *Barracouta*, and Lieutenant *Gibbons* in the evening. On the 28th November two seamen of the *Barracouta* died; on the 29th one seaman and one marine; and, on the 30th Captain *Cutfield* himself, two of his crew, and two of that of the *Leven*; making a mortality of sixteen persons in the course of five weeks.

On the 1st of December one seaman died on board the *Leven*;

on the 5th they left the bay for Madagascar ; and before the 21st or sixteen days, seven persons had been added to the list of the dead. *

From these facts it results that a space varying from sixteen to twenty days usually elapsed between thorough exposure and the development of the first symptoms. This space may be regarded as the latent period or the period of incubation, during which the poison, after having been imbibed or inspired either once or more frequently, or for some time, operates on the mass of blood, and at length, by poisoning this liquid, produces its legitimate effects on the system at large.

The same conclusions are confirmed by the subsequent progress of the voyage and survey down to 1826. In short it was observed that in all cases mostly, and with few exceptions, the disease did not appear immediately, but some time after exposure to the operation of the alleged causes.

Lastly, when the *Quorra*, in 1832, went up the Niger, a similar interval was observed to elapse between the time of her entering the river and the time when her crew were attacked with fever. She entered the Niger on the 19th of October, and fever broke out among her crew twenty-one days afterwards, on the 11th of November.

It appears, further, that Dr M^r William himself had rather reluctantly been led to admit that, allowing the disease to be the result of some morbidic poison inhaled with the atmosphere, that poison must have been imbibed in passing through the Delta. First, he says, " when it is considered that the vessels were constantly exposed to endemic influence while they remained in the Niger, it is impossible to say at what time the miasmatic poison was first inhaled ; but I hardly think it was inhaled by any individual before we left the mouth of the river. If this were so, the fever may be said to have ensued on the sixteenth day from the period of its earliest imbibition. Quarter-masters, seamen, and marines, whose duties were chiefly on deck, stokers in the engine room, cooks, and in short men of various occupations, and constitutionally dissimilar, were simultaneously affected with fever."

The last-mentioned circumstance of the simultaneous attack of so many different individuals is not only characteristic of the operation of an atmospheric, a telluric, or miasmatic poison, but it is of the greatest consequence in proving the origin of the distemper from a cause totally different from infection or contagion.

* Narrative of a Voyage of Discovery to Africa and Arabia, performed by his Majesty's ships *Leven* and *Barracouta*, from 1821 to 1826. Under the command of Captain F. W. Owen. R. N. By Captain Thomas Boteler, R. N. In two Volumes, 8vo. London, 1836. Vol. i.

"Upon the whole," concludes Dr M^cWilliam, "I am inclined to think that, in those cases which appeared at Iddah, the germs of the disease were contracted on the Delta." This conclusion we regard as so free from doubt, considering all the facts which have already come to light on this subject, that it appears to us difficult to understand how any other view can be taken. Reasons for this development or first appearance of the disease at Iddah Dr M^cWilliam finds in the stagnant state of the atmosphere, favourable to accumulation of miasmatic exhalations in its lower regions, and consequently liable to condensation, or actually concentrated; and also in moral causes, as he thinks some of the men were then dispirited. Of the existence or influence of these causes we feel not competent to speak. The explanation may be or may not be satisfactory and well-founded. But the great leading fact that the Delta was traversed without apparent injury, and that then all at once the disease broke out, is the keystone as it were of the whole hypothesis. It furnishes two alternatives, one or other of which must be adopted in accounting for the phenomena; the first, that the poison was inhaled while passing through the lower part of the river, or the Delta; the second, that Iddah was more particularly unhealthy than any other point. Now the latter conclusion would be admissible only if the circumstances were more numerous in its favour than in favour of the former. This, however, we have already seen, is not the case. It results therefore that we must adopt the former inference.

On this subject of the period of incubation, as it may be termed, of the poison, the following observations by Dr M^cWilliam deserve attention.

"Latency of the Poison."—In no case did the fever break out before the sixteenth day after commencing the ascent of the river, or sooner than the twenty-first day from entering the river. The Albert, Amelia, and Soudan were twenty-three days inside the river before fever made its appearance, and the Wilberforce about two days less; therefore, as the invasion of the disease was nearly if not wholly, simultaneous on board the ships, a case may be said to have occurred in the Wilberforce on the twenty-first day.

"Assuming that the poison was not inhaled until the vessels steamed upwards, which will reduce the period of latency to the shortest probable duration, and taking the cases on board the Albert, the ship the longest in the river, I find that out of fifty-five cases among the whites, and six among the people of colour entered in England, the days of seizure were as follows: on the 16th day, three; on the 17th, two; on the 18th, two; on the 19th, three; on the 20th, four; on the 25th, one; on the 26th, three; on the 29th, three; on the 30th, three; on the 31st, three; on the 33d, five; on the 34th, four; on the 35th, two; on the 36th, one; on the 37th, six; on the 42d, three; on the 45th, one; on the 47th, one; on the 48th, one; on the 51st, one; on the 60th, three; average

day of invasion 33-286, Among the six people of colour, two were attacked on the 16th day, one on the 18th, one on the 21st, one on the 29th, and one on the 42d day ; making the average period of attack the 25th day, (25-200.)"—Pp. 186-7.

There are, however, besides this primary or essential cause, many accessory or secondary causes, which, in some cases, appear to belong to the order of exciting, and in others to that of predisponent causes.

It is observed, for example, by both authors, that the stokers and engineers in steam-vessels, in climates where fever prevails, enjoy a greater degree of immunity from this disease than other men. Thus in all these vessels the stokers and engineers stood out much longer against the disease, and were attacked at a much later period than the other men. They were also attacked in smaller proportions, and the symptoms seemed less severe and continued than in other cases. This is ascribed partly to the dry heated air in which these men are involved, partly to the free ventilation which is kept up round the engine by the fires and the motion of the machinery, and in part also, it is said, to the profuse action of the skin.

On the other hand, it is observed, that should the vessels cease steaming, and make sail or come to anchor, and these persons be employed cleaning the engines, and performing other duties, after the fires are out for any length of time, they then fall victims to the disease. Dr Pritchett also adds, that fever usually makes its appearance during long stay in harbour, when the fires are not used, and the people are exposed to solar influence refitting.

A cause said to be very effective in inducing the disease, was exposure to great solar heat. Every instance of fever that occurred in the River Niger, Dr Pritchett assures us, could be traced to solar exposure, which was therefore, he adds, (p. 137-138, 145) the obvious immediate exciting cause. This, we believe, cannot be denied as a fact ; for it is well established, that in the equinoctial regions, and the countries bordering on them, all exposure to excessive or considerable solar heat is very liable to be followed by attack ; and often apparently from mere exposure without the aid of miasma. We are inclined, indeed, to think that the multiplied facts now collected on this subject show that solar heat alone may cause fever, and that miasma, either alone or with other adjuncts, as fatigue, gastric disorder, exposure to cold, may also cause fever. Daily also are we informed of the occurrence of cases in which it is certain, that mere intense solar heat alone in apparently dry regions may cause fever ; and we are therefore disposed to infer, that in tropical regions, two sorts of fever may be produced, one from exposure to intense solar heat, without miasma, and one from exposure to miasma with or without solar heat.

This, however, we submit as a conjecture, to be verified or refuted, to be rectified or rejected by the results of subsequent observation.

Solar exposure, in short, Dr Pritchett appears to regard as the main and almost essential cause ; and he attaches little importance to miasma or malaria alone. After adverting to the state of mind in the crews of the Niger expedition, and the possible influence of moral causes, he adds, "The influence of exposure to the sun's rays, however, appeared to be all powerful in exciting the disease ; he who was much exposed was sure to suffer ; the few who escaped probably owed their exemption to their duty not requiring them to be much or frequently in the sun, and to having been more careful than the rest. I only remember a single instance in which exposure to the sun was constantly braved without being followed by an attack."—P. 145.

In short, he regards fever as every where the same, and modified merely by local causes or circumstances proper to individuals. We doubt, nevertheless, whether the Mediterranean remittent fever can be considered as in all respects the same as the African fever. In one it differs materially, viz. its power of requiring and enduring blood-letting.

What is the most sickly and dangerous season, the dry or the rainy, is a question which has in different ways presented itself to both authors. Dr M'William informs us that the dry period immediately after the rain is the most deleterious, and in this he is joined by many observers both in the east and western regions of the tropics. Dr Pritchett states, that while the old resident in intertropical countries very constantly suffers most severely during the prevalence of the rains, and declares this to be the most sickly period, those recently arrived from Europe are principally affected in the dry hot season, usually passing through the wet season without suffering much from disease. "The native Africans," he says, "fall sick in the rainy season like the old resident European, and in the dry season feel themselves healthy." "While the whites were nearly all affected with fever at the confluence of the Tchadda and Niger, the natives were perfectly well. But previously, when the vessel was wooding and watering during the rainy season (July 1841) at Grand Bassa and Cape Palmas, many of the Africans were affected, while the Europeans generally enjoyed good health."—P. 366.

This question, however, it is not so easy to answer, as at first sight might be imagined. For at one time, and in one place, the wet season appears to be the most hurtful, and at another time in the same place, or in another locality, with characters quite identical, the dry season appears to be the most noxious and febriferous. Thus, for example, when it was attempted to colonize the Bulam Islands under Captain Beaver in 1792, the mortal and destroying fever which prevailed among the emigrants

took place in the wet season.* Yet, when the fever which was so named from that island, appeared in various parts of the West Indies, it was not during the wet season, but in many places after long-continued dry windless weather. In the second journey of Park into Bambarra in 1805, it was during the wet season, (June and July), that his party were attacked with fever and dysentery, and were destroyed in so large a proportion; and it was his own opinion, as well as that of others acquainted with the interior of Africa, that had the journey been undertaken and accomplished in the dry season, they might have lost one or two men, but not more.

On the east coast of Africa, on the other hand, according to the testimony of Captain Boteler, the dry season is in general the sickly season, and the wet or rainy is the period of health. Thus, at Delagoa Bay, it is said that "the unhealthy season prevails from the commencement of September until the end of April; and as the whalers do not frequent the bay during that period, those who are engaged in the fishery can go through the fatigues and exposures to which they must necessarily be subject, while engaged in collecting their cargo, without suffering from the effects of the pestilential vapours that rise from the earth during the sickly months, and prove so fatal to casual visitors."†

Afterwards, when speaking of the Island of St Mary or Nossi Ibrahim, he continues, "In the sickly season there is a powerful sun and cloudless sky, but during the rest of the year the rain is almost incessant, and the sky is overcast by clouds. That the wet season should be the healthiest may at first appear strange; but it seems no longer so, when it is considered that, however great the deposit from the water, there is no sun to extract putrescent vapours from it, and thus generate disease; in the dry season the reverse is the case, and the result accords with it."‡

The statement regarding the seasons at Quilimane varies somewhat. Captain Boteler first says, "The climate of Quilimane, from the swampy site of the town, is highly pernicious to health, producing deadly jungle fevers. Some years are much worse than others; and the most unhealthy times are not always during the rains; for in 1822 a great number of Europeans were carried off in the months of July, August, and September, before the wet season commenced." A little further on, however, he says,— "The rainy season, which lasts from October to February, is considered as the most unhealthy."§ And again, in reference to Sofala, he has occasion to say, that, "In the rainy season, which is also the sickly one, and lasts from March to May, the mail travels much slower."||

* Edin. Med. and Surg. Journal, Vol. xxxv. p. 367-368.

† Narrative of a Voyage of Discovery, &c. By Captain Thomas Boteler, R. N., Vol. i. p. 137.

‡ Vol. i. p. 156.

§ Ibid. p. 255.

|| Ibid. p. 356.

The only conclusion which can be drawn from these statements is, that in some places it is the dry and in others the rainy season that is most sickly.

As to the treatment pursued, it results from the statements of both authors, that it is at once unsettled and inefficient.

Both authors agree with Mr Boyle in thinking that in the African fever, patients do not well stand general blood-letting. The remedy certainly seems at first sight indicated, and often after its use the patient experiences relief. But rapid debility follows, and in general the fatal termination ensues. "In the adynamic form of fever," says Dr M'William, "which occurs on the rivers, general bleeding is certain to do harm." Both he and Dr Pritchett, indeed, after trying this remedy, gave it up as detrimental.

Local blood-letting from the nape of the neck or head is allowed, however, to be sometimes beneficial; and vomiting occasionally subsided after cupping over the epigastric region.

Calomel and James' powder, as laxative and diaphoretic, are commended. But the mild laxatives, as castor-oil and sulphate of magnesia, are admitted to have been more beneficial than the more active purgatives. Enemata were found useful, when the irritability of the stomach was so great, that all medicine was rejected.

Counter-irritants, as sinapisms and blisters, are represented to have been beneficial. Applied over the epigastrium they generally checked vomiting; and along the spine they relieved pain, removed or allayed irritability of stomach, and stopped spasmodic symptoms.

Soda water, Seidlitz water, and the effervescing powders were useful in allaying vomiting, and relieving pain and irritability of stomach.

Mercury to ptyalism was occasionally tried, and sometimes advantageously. It was, however, also tried and produced its usual physiological effects, yet without preventing the disease from proceeding to the fatal termination. Dr M'William advises that it should not be given in cases of debility; and above all that its full action should not be produced. Calomel with opium, and afterward associated with quinine, he represents as the most convenient form of the remedy.

"In connection with the subject of mercury," says Dr Pritchett, "I think it very important to observe that in several instances, where profuse ptyalism took place, it had not the desired effect of checking the fever; the disease seemed to continue more severe than ever, and in one case death ensued despite the most complete salivation," p. 166. (Case 84, George Cuthbertson, p. 79.)

This completely contradicts the statement made confidently by many, that if salivation be produced, the fever is cured and the patient safe.

The best diaphoretic Dr M^cWilliam represents to be James' powder, given alone at first, and afterwards, when the case was protracted, with quinine. The most convenient and effectual diaphoretic Dr Pritchett finds to be, to keep the person somewhat warmly wrapped up, while the patient was inhaling the open air as cool as it could be obtained.

Quinine and Warburg's drops were tried; but they were not useful till the fever was on the decline.

At a subsequent period, viz. in 1842, when in the Cameroons River, *vinum colchici* was used largely, first with solution of muriate of morphia, and afterwards alone; and, it is stated, followed by quinine with good effect.

The truth is, that the African coast and river fever is very peculiar;—is a very unmanageable disease, being both rapid in progress and peculiarly violent in the case of Europeans, and it accordingly sets at defiance all established measures, so far, that is to say, as therapeutic measures in fever can be said to be established. Its very depressing effects on the nervous system, its disorganizing effects on the mucous membrane of the stomach and on the blood-vessels, in general take place so swiftly, and are so little capable of being resisted or checked by remedies, that, in a large proportion of cases, at least one-third, as has been shown, the fatal termination will take place, whatever be done. Many observers have thought, that this peculiar unmanageability under remedial measures, is associated with the great humidity of the localities in which it mostly prevails; and certainly this is merely another way of expressing the fact, that fever, originating in very moist districts, bears evacuation badly, while that taking place in dry countries bears it well.

It may be here proper to mention, that, among the native Africans, this fever is treated chiefly by diaphoresis produced by the vapour-bath, combined with a rude species of local depletion. Thus Captain Boteler gives the following account of the method pursued by the natives of Delagoa.

“As soon as the patient feels the first attack, he retires to his hut, where he is wrapt up and kept warm, until the water in an earthenware boiler placed on the fire is boiling hot, when it is placed between his legs, while he sits down and leans over the hot steam that arises from it. In the meantime, the persons about him wrap him in mats, which shortly afterwards, though covered with perspiration and half-suffocated by steam, he casts off, and at that instant receives a cold shower-bath, applied by means of water kept in readiness for the purpose. This over, he is hurried to the side of a large fire kindled in the hut, and there placed in a recumbent posture on a mat before it, while blood is extracted from him in small quantities, by slight incisions on his shoulders, breast, and the backs of his hands. The rest is left

to nature, whose resources, powerful as they may be, often sink under the inveteracy (virulence) of the disease.”*

On the question of acclimatization, or inurement, as it may be called, both authors have furnished us with some observations; but they are neither precise nor satisfactory. The subject, indeed, is one of great difficulty. To us it appears, from the observations of all the best observers, and among them the present authors, that no degree of residence can enable a European to withstand the violence of this distemper, which in one form or another will assuredly cut him off, if he remain long enough. A change is induced, it must be allowed, in the constitutions of blacks resident for some time in Europe, in consequence of which change they become more liable, than blacks who have never left the tropics, to African fever. And in like manner, in the constitutions of Europeans long resident in Africa, or any of the tropical regions, some change is induced, in consequence of which they present the distemper not quite in the same open and distinct manner in which it appears in whites recently arrived on the African coast. But no length of time appears to efface entirely the susceptibility of the human frame to be attacked by it, especially when exposure is sufficiently lengthened.

The perusal of these volumes is invested with much interest, both from the nature of the subject, and the information communicated, which indicates the possession of high accomplishments, as well as great talent, in the authors. The narrative, nevertheless, it is impossible to peruse without being completely convinced, that there is no reasonable hope, that either the rivers of Africa can be navigated, or the interior colonized by Europeans, without a very great sacrifice of human life. It is now nearly 100 years since we began to acquire experience on this subject; yet there seems to prevail the same hope that we are to triumph over natural difficulties, and surmount the barrier of disease and mortality, with which the African coast is surrounded. First we had the testimony of Lind as to Whydah and Cape Coast Castle, as well as that of Balmain and others. Then came Dr Schotte, who described with great accuracy the murderous fever of Sierra Leone. Then followed Dr Winterbottom, who had long resided in Free Town and knew its vicinity well. Next follows Captain Beaver and the Bulam colony. Then, after a long interval, Captain Tuckey as to the Zaire, and Mr Boyle as to the West Coast; and Captains Owen and Boteler as to the East Coast and the Bight of Benin. Last of all follow Mr Macgregor Laird and Mr Oldfield, and the present authors. Lastly, the French have for several years past been experimenting on the febriferous properties of Algiers and the north coast of Africa; and the result shows that this

* Narrative of a Voyage of Discovery, &c. By Captain Thomas Boteler, Vol. i. p. 137.

part of Africa is little less fatal to Europeans than the east and west coasts. The evidence collected is neither scanty nor equivocal. It is rather abundant, distinct, and quite intelligible. It says to the European traders, that Africa must be to them a country either entirely unvisited, or visited at the risk of losing uniformly one-third, probably a larger proportion, of the party adventuring.

The question naturally arises, is there in the interior of Africa or its commerce any thing to compensate for risks so great and so certain? And can it ever be expected that the time will come when the rivers of Africa can be safely navigated by Europeans?

The first question we have no means of answering, and it may be safely left to those who know the comparative value of human life and the value of African commodities.

Upon the second, light may be thrown by comparing the African rivers with those of other countries, and considering their peculiarities.

The great extent of its Delta is probably the most peculiar feature in the Lower Niger; and this again depends upon the large extent of flat alluvial country through which the lower branches of the river find their way to the sea. It is most probable that at one period a great part of this Delta formed an extensive bay of the sea, not very deep; and that the river joined the sea probably 100 or 150 miles farther inland than it does at present. As the river must have been incessantly carrying down the soil and detritus from the higher and more internal parts of the country, these it would deposit in the bay, where a considerable proportion of them would fall to the bottom, and, in the lapse of ages, form shoals, banks, and other elevations. It would only be where the current pursued its forcible course that the greatest depths would be; and, as in the case of several large rivers when they join the sea, the main current would often be divided into several smaller ones, or one main current and several small ones with intermediate banks, bars, and shoals.

This process of deposition at the bottom of the bay would be constantly proceeding, augmented periodically by the floods following the equinoctial rains, and, though often varying, ever tending to the same results, the filling up of this extensive bay. At length, when some of the shoals and banks rose to a level with the surface of the water, the currents would naturally be more confined between them; and while they were progressively increasing, the bay would present not only a series of bars, banks, and low islands, but several distinct currents or streams flowing with different degrees of force and velocity between them.

In this manner apparently, so far at least as we can apply observation of present phenomena to the elucidation of the past, the Delta of the Niger has been formed. The present tract, probably a little below Iddah, was at one time under the surface of

the Atlantic; and the river joined the sea perhaps twenty or thirty miles below that town. In the lapse of ages, however, it has, by carrying down the detritus of the high lands, formed this extensive flat alluvial Delta, which is at present known to be traversed by the divided branches of the river.

The febriferous properties of this and all similar tracts continue long after the soil has been gained from the sea, sometimes for centuries; and it is only after the travelled soil has become thoroughly consolidated and less capable of permeation, or indeed impermeable by water, that its power of exhaling miasma is diminished or ceases. Not only must the currents of the main stream be confined within proper banks, but the surface must be elevated and cultivated, the subsoil must be dried and drained, and, in short, the dry land must be thoroughly separated from the waters before any perfect change can be effected.

A long series of ages must elapse before this can happen to the Delta and basin of the Niger. Unlike the great rivers of the American continent, which flow through valleys with elevated sometimes hilly banks, it pursues a course for a very long space through land not much raised above its own level, and the whole of which is flooded far and wide during the periodical rains. This very process of annual flooding has doubtless a tendency to raise the neighbouring land; but this tendency does not advance with rapidity, where the surface is liable to annual or semestral submersion and inundation. The time will probably arrive when all this alluvial soil will raise its head permanently above water. But this must be accomplished only by long-continued and well-directed efforts of human industry, and most likely aided by agriculture, draining, embankments, and the other arts of civilization. Probably, one century or two centuries after the present time, these rivers may be embanked, the surface may be drained; the subsoil may be consolidated; and a large part of this dangerous region may be covered with cultivated fields, industrious villages, and populous and opulent towns, and its estuaries be adorned with quays and harbours filled with vessels.

ART. II.—*Medicines; their Uses and Mode of Administration; including a Complete Conspectus of the three British Pharmacopœias, an Account of all the New Remedies, and an Appendix of Formulæ.* By J. MOORE NELIGAN, M. D., Physician to Jervis Street Hospital, and Lecturer on Materia Medica and Therapeutics in the Dublin School of Medicine. Dublin, London, and Edinburgh, 1844. 8vo. Pp. 432.

On several of the departments of medical science treatises of

different kinds are at present so much multiplied, that the difficult task is to select from the number the one most suited to the purposes of the reader, whether student or practitioner. From this character the department of materia medica is not exempt; and within the last few years many works, varying in extent and varying also in merits, have appeared before the profession. If this multiplication of works on one subject is productive of inconveniences and evils, it is also not without advantages and benefits. Superfluity and abundance are always better extremes than paucity and want; and though the judgment may be at times perplexed in making the best selection, yet to have the means of selection is at all times and in all cases a pleasant alternative.

It is on this account that we think the profession will not be disposed to find fault with the appearance of another work on *Materia Medica* in addition to those which we already possess. The present treatise, indeed, possesses certain peculiarities and several recommendations which may plead its cause with those, who bestow much attention on therapeutics and materia medica. Besides, that it is more abridged and condensed, and consequently less bulky than most of the treatises on materia medica, it contains information on several of those new remedies which, whether with good or bad effect, are from time to time introduced to the notice of practitioners of medicine.

The arrangement of this work is peculiar. It is neither wholly alphabetical, like most of the dispensatories of modern times, nor is it pathologico-therapeutic, like the systems of materia medica of Cullen, Murray, Barbier, and others. It is a mixture of both; and, consequently, cannot be said to have much pretension to scientific order. The method is, nevertheless, practically useful; and we believe that this circumstance will render it a convenient and popular work for reference and consultation.

The principle of the chief or fundamental arrangement, as it may be denominated, is, chemical, mechanical, physiological, pathological, and therapeutic; that is to say, the articles of the materia medica are arranged into families or orders according to their chemical, mechanical, physiological, and pathological properties, and, in some instances, according to therapeutic effects; and then these families or orders are arranged alphabetically. Thus the whole treatise is subdivided into twenty-two chapters, devoted in succession to the chemical, pharmacological, and therapeutic elucidation of the following subjects: I. Antacids, II. Anthelmintics, III. Antispasmodics, IV. Astringents, V. Cathartics, VI. Cauterics, VII. Diaphoretics, VIII. Diuretics, IX. Emetics, X. Emmenagogues, XI. Emollients, XII. Epispastics, XIII. Errhines, XIV. Expectorants, XV. Narcotics, XVI. Refrigerants, XVII. Sedatives or Contra-stimulants, XVIII. Sialagogues, XIX.

General Stimulants, XX. Special Stimulants, XXI. Tonics, and XXII. Supplementary Agents.

These are followed by two appendixes; the first containing a list of Formulæ, the second a Posological Table.

Of a work thus arranged it is unnecessary to enter into any analytical account. It is, in truth, a sort of Lexicon or Cyclopædia of Remedies. We shall merely attempt to explain shortly the mode in which the subjects are treated.

Each chapter is commenced with a preliminary notice of the general characters of the family of medicines, the detailed history of which is to form its subject. These notices are short and condensed; but they contain the most important circumstances requiring to be known, all those at least of a general or common character; leaving details and peculiarities to the history of the individual articles. These notices are given with considerable clearness; and we are sure that they will be very useful in impressing on, or recalling to, the mind of the student the essential circumstances which he ought to keep in remembrance.

The article is first given under its different denominations; then, if a vegetable, it is briefly distinguished by its botanical characters, and a short account of its natural or commercial history. Then follow the physical characters; the chemical characters; the mode in which it is prepared, if a chemical substance, and adulterations where they are practised. Then follows the account of the therapeutic properties; next that of the pharmacological preparation and mode of administration, with the doses. Lastly, if the substance possess poisonous properties, the antidotes are specified.

As a specimen of the mode in which this part of the work is prepared, we give the following extract containing the history and therapeutic uses of *Monesia* and the Indian hemp,—remedies not yet in very general employment.

“*MONESIA*.—Under this name a few years since, an astringent extract was imported into France from South America. It was said to have been obtained from the bark of a tree, a native of Brazil, but the name of which is not known. The extract was brought over in large cakes, which were purified by dissolving in water, filtering and evaporating; the purified extract is in small fragments resembling kino in appearance, but it has not the peculiar ruby lustre of that substance. The taste is at first sweetish, then astringent, and the odour feebly aromatic. It dissolves readily in water, affording a dull brown somewhat opaque solution. According to the analysis of MM. Derosne and Henry, it consists of tannin, red colouring matter, glycyrrhizine, and a peculiar acrid principle which they have named *Monesine*.

“Like numerous other medicines when first introduced, *monesia* was extravagantly lauded as a remedy possessing powerfully astringent properties. Experience has, however, proved that it is much

inferior either to kino or catechu; and it probably may take an intermediate station between those substances and extract of rhatany. It has been used in all cases where astringents are admissible both externally and internally; but the disease in which it appears to have been most serviceable is chronic diarrhœa.

D. and M. of ADM.—In substance gr. v. to gr. xv. Tinctura Monesiae DONOVAN (extract of monesia $\mathfrak{z}$ i; proof spirit s. $\mathfrak{z}$ xss; water s. $\mathfrak{z}$ ii; mix, and when the dregs have subsided pour off the tincture) dose s. $\mathfrak{z}$ i. to s. $\mathfrak{z}$ ii —Mistura Monesiae (extract of monesia $\mathfrak{D}$ ii; water s. $\mathfrak{z}$ viiiss; compound tincture of cardamoms s. $\mathfrak{z}$ ss. mix,) dose s. $\mathfrak{z}$ ss. to $\mathfrak{z}$ ii. two or three times a day.

INCOMP.—Mineral acids; salts of iron, zinc, and lead; opium; and sulphate of quina."

On this we would observe, that it is of small moment whether monesia be a powerful astringent or not, or whether it come up to the praises originally conferred on it. All good physicians know that very powerful astringents are very bad and dangerous medicines, and in rash hands are often the means of doing much mischief. After all, is one not disposed to ask if it is of any use to apply astringents, and especially potent astringents, to the living fibre? Is any disease really cured by such means? It is a well known fact that even in diarrhœa they seem often to cause much mischief, not removing the cause of the diarrhœa but causing new evils.

"*Cannabis Indica*.—Indian Hemp. According to the most recent observations, it would appear that the Indian hemp is precisely identical in botanical characters with the common hemp of this country, the *Cannabis sativa*; differing only in the secretion of a resin with which it abounds, and which is totally absent in the European kind. It grows in India and Persia; and belongs to the natural family Urticaceæ, and to the Linnæan class and order Diœcia Pentandria.

"(B. C.—Annual, about 3 feet high; stem branching, pubescent, angular; leaves alternate or opposite, digitate, scabrous, on long weak petioles; leaflets linear, lanceolate, sharply serrated; flowers dioecious, in axillary clusters; achenium ovate, one-seeded.)

"P. U. and M. or Prep.—The dried plant and resin; the former is cut when the plant is in flower, and allowed to dry in the sun for three days, care being taken not to remove the resin; it is called in India, Gunjuh. The resin, which is called churrus, is collected in Central India and in Nissal in the following manner:—"Men clad in leathern dresses run through the hemp fields, brushing through the plant with all possible violence; the soft resin adheres to the leather, and is subsequently scraped off, and kneaded into balls; a finer kind is collected with the hand; in some instances the leathern attire is dispensed with, and the resin is gathered on the skins of the naked Coolies." (O'Shaughnessy.)

"P. P.—Gunjah is sold in bundles about two feet long, and three inches in diameter; it consists of the stems with the leaves and flowers accreted together by the resinous exudation; it is of a dusky

green colour, and has an agreeable narcotic odour (as met with in this country, however, the odour is feeble), and a bitter taste resembling that of tobacco. Churrus is a hard resin of a blackish grey colour, a fragrant narcotic odour, and a bitterish, acrid, slightly warm taste; it is not generally met with in this country. The leaves and capsules without the stalks are sold in India under the name of Bang, Subjee, or Sidhee; they have also been imported into Britain, but their medicinal property is very feeble; they should not, therefore, be employed in the preparation of the extract or tincture.

"*C. P.*—The medicinal properties of the Indian hemp are due to the resin which it contains, and which has been named Cannabin; it also contains a small quantity of volatile oil, which has not been examined. The dried plant yields to alcohol about 20 per cent. of resinous extract, which is of a dark reddish-brown colour; has a rather fragrant, narcotic odour, resembling that of canaster tobacco, and a bitter, somewhat acrid taste.

"*Adulterations.*—Several specimens of the extract of Indian hemp which I have met with did not possess the peculiar odour or taste of the extract as prepared by myself; whether this arose from faulty preparation, or the substitution of some other substance, I cannot say. The true extract is readily known by its peculiar odour and taste.

"*T. H. E.*—Although the Indian hemp has been used in Persia and throughout India for many hundred years, for producing inebriation, and also as a medicinal agent, it has only been very recently introduced into British Medicine, through the exertions of Dr O'Shaughnessy, late of Calcutta, consequently the observations made on its medicinal virtues have been as yet very limited. In its action on the system it is decidedly narcotic, producing at the first the effects of a powerful stimulant, which, if the dose taken be sufficiently large, are soon followed by those of a direct sedative. The preparations of the Indian hemp have been chiefly employed in the treatment of neuralgic and painful affections; in most of which they have proved very beneficial. Thus, they have been given in tetanus, hydrophobia, infantile convulsions, sciatica, chorea, neuralgic pains, and chronic rheumatism; they have also been used to subdue sleeplessness or disturbed rest, provided it does not arise from inflammation of the head. All who have tried the effects of this remedy in the British isles have come to the conclusion, that the Indian hemp must be given in much larger doses in this country than in the East, and since his return home, this has been acknowledged by Dr O'Shaughnessy himself. The trials made with it in the diseases above enumerated would seem to show, that the *Cannabis Indica* may be used with benefit, as a substitute for opium, in cases for which that drug is unsuited from idiosyncrasy or any other cause; and also that it will occasionally succeed in abating, sometimes in completely removing pain where this agent totally fails us. In consequence of its stimulating properties the use of the Indian hemp is contraindicated in acute inflammatory diseases.

"*D. & M. of Adm.*—The preparations of this drug, which are at present in use, are the resinous extract and a tincture; they are pre-

pared as follows ;—*Extractum Cannabis*. (Take of the dried flowering tops, rejecting the stems, any quantity ; rectified spirit a sufficiency ; boil the tops in the spirit until all the resin is dissolved out ; distil off the spirit with the heat of a vapour bath, so as to obtain an extract of a proper consistence.) Dose—10 grains to 12 grains, gradually increased, until a tendency to coma is produced ; gr. ss. to gr. iss. is the dose usually given in the East, and this quantity frequently produces marked effects there. It is best given in the form of pill.—*Tinctura Cannabis*, O'Shaughnessy. (Extract of Indian hemp gr. iii.—proof spirit $\mathfrak{z}$ i. ; dissolve.) Dose $\mathfrak{z}$ i. to $\mathfrak{z}$ ii. frequently repeated until the desired effect is produced. This tincture is decomposed by water, the resin being precipitated in the form of a pale yellow colour. It should therefore be suspended in aqueous vehicles, by means of mucilage, syrup, or yoke of egg.”—Pp. 193–195.

In the last chapter on supplementary agents, Dr Neligan includes different articles, which, though not employed in medicine from their remedial powers, are in frequent use as *colouring agents, perfumes, tests, and pharmaceutical agents*.

Besides giving, in the manner now described, the history of all the articles recognised by and admitted into the three British Pharmacopœias, Dr Neligan gives accounts of various remedies which have been recently recommended or actually used in the treatment of disease, but which have not yet received the sanction of either of the British colleges. Of this kind are such articles, as gold and its preparations, *monesia*, tannin and tannic acid, urea, Indian hemp, bromine, bromide of potass and bromide of iron, bladder wrack, (*Fucus vesiculosus*), indigo, iodide of sulphur, citrate of iron, lactate of iron, salicine, and a few more. On these and similar substances and their therapeutic effects, the author gives short notices, which we think are not found in any other work on the subject. This work, upon the whole, we are inclined to regard as a useful treatise on *materia medica* at the present time, and calculated to afford, within a short compass, a tolerably just view of the present state of knowledge in that branch of medicine, and as such we recommend it to the profession.

We cannot conclude this short notice, however, without saying that the perusal, or at least the frequent consultation of the work, has, in common with that of various recent works on the same subject, forcibly impressed us with the great evil resulting from the present extensive, unsettled, and, we had nearly said, inefficient state of the *Materia Medica*. The great multiplicity of articles with which the present lists of the *Materia Medica* are furnished, would make the reader at first sight imagine, that he had a remedy for every disease, and certainly a means of fulfilling every indication. Yet, when he sees them applied, or when he comes him-

self to apply them in practice, how wofully is he disappointed. He finds that scarcely one of the agents answers the expectations created ; that oftentimes scarcely one in ten produces the physiological effects assigned to it ; and certainly not one in twenty accomplishes the therapeutic results. He, therefore, very soon after being some time in the hospital or dispensary practice, is at first confounded, perplexed, and discouraged. At length he sees, that by those actually engaged in the treatment of diseases, but a very small proportion of articles in the long lists of the *Materia Medica* are ever employed. Four or five cathartics, two or three diaphoretics, two or three diuretics, calomel, antimony, muriate of morphia, sulphate of quinine, blood-letting, general and local, blisters and caustics in one or other form, constitute the whole of the remedial measures which are ever employed in practice.

He cannot resist the inference, that by far the largest proportion of these multifarious lists are either meant for show and not for use, or that, at all events, the chief use is to cause him a prodigious deal of labour, trouble, and anxiety in acquiring an imperfect and cursory knowledge of articles which are never to be of the slightest use, and which, in point of fact, are never used.

Nor is even this the whole amount of the evil. When the student contrasts the numerous catalogue of articles and agents, of the properties and effects of which he must acquire some knowledge, with the small and abridged list of those which he finds in common or frequent use, his mind becomes undecided, his judgment is perplexed, and too often his practice runs the risk of becoming unsteady and inefficient. He is tempted not unfrequently to trust to new remedies, which are recommended strongly by high authority to the exclusion of others, the merits of which, such as they are, have been long known ; and he sometimes learns, in such circumstances, that the time which might have been profitably spent in removing the disease, or at least abating its violence, has been most unprofitably lost in doing little or nothing. He is then beset with another evil. He thinks that his professional brethren either exaggerate the effects of remedial agents, or cannot observe either the phenomena of disease or the effects of remedies ; and he then goes to the opposite extreme of disbelieving all statements, and doubting the alleged effects of all remedies, but those which he himself witnesses.

A most essential service might be rendered to the cause of genuine *materia medica* and genuine therapeutics if all the articles and agents not commonly used, and which, therefore, it is to be inferred, are really not useful, were to be either expunged from the list, or at least marked in such a way as to show, that they did not deserve the confidence which is in various works either claimed for them, or represented to be reposed in them. We frankly

confess that the proposition now made is surrounded with difficulties. But as we know that there is no complaint among all orders of the profession so general as that against the multiplicity of articles in the *materia medica*, so we believe that it is a general opinion that in no department of practical medicine are retrenchment and concentration, precision and selection, so much demanded.

These observations we submit as suggestions for others, to be adopted or rejected as further reflection may dictate. The proposition may prove impracticable or inexpedient. But the evils on which it is founded are so manifest and urgent, that it seems quite necessary to give them some consideration, and above all to consider whether they be susceptible of abatement or removal.

ART. III.—*Miscellaneous Contributions to Pathology and Therapeutics; being a series of original and practical Papers on Rickets, Hydrocephalus, Impotence, and Sterility, Pulmonary Apoplexy, and Hæmoptysis, &c.* By JAMES RICHARD SMYTH, M. D. 8vo. London, 1844. Pp. 341.

Dr Smyth's work consists of a number of detached papers on particular diseases, most of which were published in the *Medical Gazette* and *Lancet*; and the notice which one or two of them received appears to have induced him to collect them together and publish them in their present form.

The first series of papers is devoted to the pathology and treatment of rickets and hydrocephalus. In them, the author, by a reference to several interesting cases, endeavours to show that rickets, hydrocephalus, and scrofula are but different forms of the same morbid state of the system, and are very generally, indeed almost always, connected with diseased liver and disordered state of the functions of the alimentary canal. It is admitted, however, that, for the most part, the predisposition to these diseases is "chiefly referrible to hereditary taint and organization," and one of the arguments he uses for arriving at this conclusion, as well as for that they are varieties of the same morbid state of the system is, that we occasionally see different members of the same family affected with all these diseases. While one may have rickets, another may be labouring under hydrocephalus, and a third with scrofulous enlargement of the glands; or two of these may often be seen in the same subject.

Dr Smyth attributes rickets chiefly to impaired digestion and general nutritive and organic assimilation, and consequently directs his treatment to the improvement of these by generous diet and appropriate medicaments. Dr Smyth's remarks as to the die-

tetical regimen of the little patients appear extremely judicious, and, in addition to having the authority of Sir Astley Cooper, are those on which we have frequently insisted in this place. It is too much the habit to give little animal food to children, above all to delicate children; but Sir Astley prescribed the use of animal food to those labouring under scrofulous disease or debility three times a-day; and we have often seen children seriously affected with scrofulous enlargement of the glands recover their health and strength under little more than this regimen, warm clothing, and an occasional dose of rhubarb with carbonate of soda.

Several of the cases of rickets described were complicated with hydrocephalus, and Dr Smyth has the merit of first directing the attention of the profession in this country to the existence of certain sounds heard on applying the stethoscope to the head. Certain of these sounds he considered as diagnostic of the presence of watery effusion within the brain, and he observed that this sound disappeared as the effusion was absorbed. This same subject was simultaneously investigated by Dr Fisher of Boston; but Dr Whitney of Newton, Massachusetts, has given by far the best account of the various cephalic sounds. Even in the healthy brain he recognises four sounds, viz. of the heart, of the respiration, of the voice, and of deglutition. The bellows or purring sound, which is peculiar to morbid states of the brain, Dr Whitney found present when the person was labouring under congestion of the brain, inflammation with or without effusion, chronic hydrocephalus, compression from a depressed portion of the skull, ossification of the arteries, induration of the cerebellum, aneurism of the cerebral arteries, certain hydrocephalic diseases, as well as in states of excessive anemia and exhaustion. The gentle murmur or bellows sound was present in eight of the cases of chronic hydrocephalus described by Dr Smyth, and in one of congestion and incipient inflammatory action of the brain, produced by the irritation of teething. It cannot be doubted that this aid to diagnosis will prove of some value when the attention of the profession is more fully called to the subject.

Dr Smyth is a supporter of the operation of tapping the brain in cases of chronic hydrocephalus, where other means fail. One case is narrated where the symptoms appeared to be temporarily ameliorated by the firstappings; but, as in every other recorded case, the water seemed to accumulate faster after each operation, and failed after all to prolong the life of the patient. The author, in commenting on the probable cause of the fatal result in such cases, states that after each operation a certain amount of collapse of the brain takes place, which gives rise to attacks of inflammation and consequent effusion. Every precaution ought, therefore, to be adopted to prevent this collapse; and the author remarks that

this would probably be best prevented by extracting the water slowly, and in small quantities at a time.

The second series of papers is on impotence and sterility as it affects the male. The particular malady described by the author has been long known as being produced by over-indulgence in sexual intercourse, but more especially by the pernicious vice of masturbation. These states being merely symptomatic of the fearful prostration of mind and body which such practices induce, do not deserve to be erected into the place of a separate disease; and this conclusion is borne out by the fact, that in prescribing remedies for the alleviation of the patient's suffering, no special remedies are given for these symptoms; they are treated entirely through the general system. This fact is illustrated by the instructive cases which the author narrates, the treatment of which seems to have been conducted on sound pathological principles. Many of these cases are given with the utmost minuteness of detail, yet with a fearful and graphic truth, which prevents the reader's attention from flagging in the perusal. The state of melancholia and hypochondriasis which so commonly attends this complaint is prominently brought out by the publication of several of his patient's letters to the author, describing their own case. The treatment found most successful in these complaints was attention to the bowels by the administration of blue pill or other mercurials at bed-time, either alone or with colocynth and rhubarb, followed in the morning by castor oil or compound rhubarb pill; and when the biliary and intestinal secretions became somewhat improved, different bitter infusions, with occasional doses of senna, or salines, and lastly chalybeates.

The next paper is on pulmonary apoplexy and hæmoptysis, and consists of observations on a case where these affections were complicated with pneumonia, pulmonary emphysema, and asthma. In commenting on the employment of blood-letting in pneumonia the author dissents from the practice of Laennec and the French practitioners, who draw blood late in the disease; and approves of that generally followed in this country. As to this it may be remarked, that, even allowing the French excelled us in the differential diagnosis or pathology of disease, they have still much to learn from our superior modes of treatment.

Remarks on a case of rheumatic pericarditis and pleuritis constitute the next paper. In it the author directs attention to the danger of inducing syncope in cases where there exists organic affection of the heart, and to the advantage of administering mercury so as to effect the gums, under which the rheumatic pains are frequently found to abate.

The last paper contains the account of a case of false aneurism at the root of the aorta, which burst into the pericardium and

produced death after 51 hours. The patient was a boy of 16. The aneurismal sac was of a pyramidal shape, its base resting on the right auricle and ventricle of the heart, which it slightly overlapped, while its apex ascended nearly to the *arteria innominata*. The arch of the aorta lay on its left, the descending *vena cava* on its right, the anterior mediastinum on its front, and the pulmonary vessels of the right lung were behind it. The serous membrane of the pericardium, with some cellular tissue consolidated by effused fibrin, formed the sac, excepting at that part where it lay over the aorta. The wall of the aorta was thin as paper, soft, and easily torn. A large ragged aperture was seen on the anterior portion of the sac, through which the blood had escaped into the pericardium. Two small apertures about a quarter of an inch from the aortic valves formed the communication between the aneurismal sac and the interior of the blood-vessel.

ART. IV.—1. *Letters on Mesmerism*. By HARRIET MARTINEAU. London, 1845. 12mo. Pp. 65.

2. *Medical Report of the case of Miss H——— M———*. By T. M. GREENHOW, Fellow of the Royal College of Surgeons of England, Senior Surgeon to the Newcastle-upon-Tyne Infirmary, &c. London, 1845. 8vo. Pp. 24.

“WHEN thou art alone in thy cell,” says Simeon, Abbot of the Monastery of Xerokerkos, to his followers, “shut thy door and seat thyself in a corner. Raise thy mind above all things vain and fleeting; then place thy chin on thy breast, turn thy eyes with all thy soul to thy navel. Hold further thy breath, even by thy nostrils; seek within thee the place of the heart, where dwell all the faculties of the soul. At first thou wilt find only thick and impenetrable darkness; but if thou persevere in this practice night and day, thou wilt feel uninterrupted happiness. As soon as the soul has discovered the seat of the heart, it perceives what it had never known; it sees the air in the heart, and feels itself also enlightened and filled with knowledge.”*

Such was the exhortation which the Abbot of Xerokerkos addressed in the middle of the eleventh century to his disciples, in order to recognise what he denominated the Light of Mount Tabor, an internal illumination of the soul perceived by the spiritual eye of fancy, seen by none but those who firmly and confidently believed the doctrine, and the perfect efficacy of the means prescribed, to obtain the favour of this beatific vision. And such

* *Histoire Ecclesiastique*. Par M. Fleury. 4to. T. xxieme, liv. xcv. p. 23.

was the occupation in which, two centuries after, Barlaam, the Calabrian monk, found the Quietists of Mount Athos engaged when he visited these monasteries. It was, indeed, the method of prayer and worship observed by these Hesychasts (*Tranquilli*) as they were also denominated.

At this period, that is about 1341, the chief or head of these tranquil and fanciful dreamers was Gregory Palamas, whom Nicephorus Gregoras had heard assert that he had seen with his eyes the Divine essence. This declaration Nicephorus asserted he had heard made by Palamas and his associate Drimyr, in the presence of several persons, before Barlaam came into Greece, that is, before the year 1328. He had at that time rather keenly reprehended both Palamas and his associate Drimyr, and had communicated the fact to the chief Logothete and several learned prelates, who agreed in considering it as the heresy of the Marsalians which had prevailed in the fourth century, and commanded him to flee from the country of these people. Palamas maintained that this Divine and uncreated light was that which had appeared to the Apostles at the Transfiguration; that it had appeared to several saints and martyrs; and that it might be perceptible by men though imperfect and sinful.*

These fancies the monk of Calabria denounced as absurd and heretical; and a fierce controversy on the difference between the eternal God and the uncreated light followed, in which the court and city of Constantinople were involved. It is very likely that the alleged light was, as Gibbon deems, the production of a dis-tempered fancy, the creature of an empty stomach and an empty brain. It is certain that such a light can have no existence unless in the fond belief of those who thus imagine themselves to be distinguished above the rest of mankind. Yet, whether it was that common sense and observation were rejected, or that Barlaam was unable to disprove the existence of this illumination, it is certain, that he was overthrown and condemned; that the followers of Palamas triumphed; and that the light of Mount Tabor was made an essential article of the orthodox creed at that period.

These facts might be safely left in the pages of the ecclesiastical historians by whom they have been recorded, were they not useful in showing that the art of lucid vision with the internal eyes, or what is called *clairvoyance*, is not a very modern invention. It is very true, that by the Hesychasts of the 11th and 12th centuries it was applied to distinguish and understand subjects, which we have very good authority for believing, cannot be known in any way in this present life. The principle, however, is quite the same; and the operation of the imagination must be perfectly similar.

* *Histoire Ecclesiastique*, Tome xx. p. 24.

The quietism of the eleventh century had its original rise in a country highly favourable, and among a race of men peculiarly prone, to fanaticism and enthusiasm. But kindred spirits are found in the west of Europe; and forms of quietism in all respects, similar arose in many of the religious houses of France, Germany, and Italy. It is well known to those acquainted with the history of these establishments, that many of the nuns, and the most esteemed female saints, were distinguished for the frequency of their visions, and the extraordinary and marvellous character of the revelations then vouchsafed to them. The visions of St Theresa and her occasional contests with the prince of the power of the air are little else but demonstrations of this quietism, and internal illumination. Nor was this delusion confined to the fair sex alone. In several instances the dreaming monks in their cells had the confident belief that they enjoyed at certain times visions similar to those of Moses on the mount, Isaiah by the altar in the Temple, Daniel by the river Ulai, and St John the Divine in the solitary island of Patmos.

It is not difficult to understand how all this took place. Among a race of people imperfectly informed, shut up from intercourse with mankind, and consequently with their minds seldom or never occupied with external objects and the real affairs of life, it is not wonderful that the fancy should become predominant, and, furnishing its own materials for contemplation, should also create its own thoughts, and substitute as realities the shadowy productions of its uncontrolled power. These, indeed, were persons who spent their days as well as their nights in dreaming; and they dreamed so long and so constantly that they at length converted these dreams and visions into realities.

The favourable reception given to these fancies depends on two causes. The first is the tendency or proneness to believe, and more especially to believe what is either very agreeable, or what is very extraordinary, or even marvellous, and especially mysterious. The second is the love of the marvellous and the mystical, and the ambition of penetrating into mysteries which are, doubtless, for good reasons, concealed from the human intellect.

It seems, nevertheless, improper to overlook the influence of another cause or set of causes which began to operate at an early period of the Christian era, and extended, entwining itself, like the strands of a cable, with the doctrines and practices of religion to the time of the 15th and 16th centuries at least. This was the doctrine of the Cabala, originally derived from the Essenian sect, and composed of a strange mixture of the *Æons* or emanations of Zoroaster, the secret meaning and allegorical interpretation of the words and the letters of the Holy Scriptures, and the mystical doctrines of the latter Platonists. According to Akibha and Simeon Ben Jokhai, the most esteemed authorities on this

system, from the infinite and eternal God proceeded ten æons or angels, who created the first world. The three first emanations are *Hekame*, *Bine*, and *Irath*, knowledge, intelligence, and wisdom. But besides this first world, there are other three, between which there is such a relation, that every thing which takes place in the last exists already in idea or figure in the first. In the treatment of diseases, the great object, according to these doctors, is to call into action the corresponding forces or powers of the superior worlds, which are then understood to act on the frames of the human race, and the distempers with which they are afflicted. This knowledge can be possessed only by him to whom the Cabala has disclosed the knowledge of these superior worlds, and who during his pious and contemplative life has rendered himself worthy of communicating with the celestial powers. Such qualities are a great deal more essential to the successful practice of medicine than all earthly knowledge, which often fails the physician in difficult circumstances.

Though this doctrine had originated among the Hellenizing Jews of Alexandria, who laboured thus to unite the pure theosophy of the Rabbins to the Pagan philosophy of Plato and Pythagoras, yet it very soon was propagated among the Greek and Roman philosophers of the Lower Empire and also among the Christians. Among the former, Apollonius Tyanæus was a most important personage, and contributed, partly by his dexterity and boldness, with the simplicity of his life and his habits of self-denial, partly by a great amount of such knowledge as was then taught, to render the Cabalistical philosophy and the pretensions of magic popular and fashionable. To this impostor many authorities ascribe the invention of talismans or amulets inscribed with mystical, sacred, or unknown terms, and which were supposed to possess the power of protecting the wearer from various evils and calamities, and from all diseases.

Among the latter was Ammonius Saccas, the founder of the new or later Platonic school. Though all these persons were much divided in their sentiments, for false and erroneous doctrines are always liable to division and dissent, they all agreed in such general propositions as the existence of one Supreme and Eternal source of Light; that from this emanated or proceeded Genii or spirits of high intelligence and of certain powers; incorporeal, yet presiding over the phenomena of material bodies and the universe in general; and sometimes protecting and rewarding, sometimes punishing and afflicting the human race. The communication with, and favour of these beings, also, it was supposed, could only be obtained by great self-denial, by refusing all sensual indulgences, and by the practice of frequent prayer and contemplation.

Medicine has at all times received an impression more or less

strong from the philosophy and the theology of the day. In the middle ages, indeed, when ecclesiastics, secular or regular, practised medicine, and almost the only physicians were or had been ecclesiastics, it was impossible that medical theory or medical practice could be void of this influence. All the treatises and medical writings, accordingly, of the fourteenth and fifteenth centuries betray distinct indications of this influence, mixed however, and often mystified with the oriental fancies of the Arabian physicians.

The belief in the influence of demons, spirits, satan and all his ministers, in demoniacal possession, witchcraft, sorcery and magic was, if not universal, at least general. It was indeed admitted by all who believed any thing; and it was quite as safe for any one to deny the influence of evil spirits, the existence of witches and witchcraft, as it was to deny the existence and influence of the Holy Spirit. This fact all authors have remarked. But they have not observed how strangely in the maintenance of these opinions, the principles and doctrines of Christianity were associated with, and corrupted by, the polytheism of the ancient pagan world.

Christianity was, indeed, then much corrupted and degraded by the vain traditions of men. At length came the time, when the eyes of mankind were to be opened by the perusal of the Scriptures, by each exercising the right of judging for himself, and when human authority and human tradition were to be reduced within narrower and more just limits. Yet this great reformation, beneficial as it was, did not remove the influence of demons and supernatural beings. On the other hand, the existence and agency seemed to be more fully recognised than ever; and in the 16th century, so remarkable in all other respects for the rapid progress made by the human mind in learning and knowledge, and in exerting the power of thinking and acting for itself, a new system of supernatural and ideal beings and agencies was called into existence and made to perform an important part in the good and evil conditions of the human race. An appetite for visions, for trances, for revelations, a taste, above all, for the mystical, a firm belief in the existence and constant agency of demons and spiritual beings, good, bad and indifferent, the doctrine of the occult qualities of material bodies, or the idea that all material bodies possessed certain latent powers of action on the bodies and souls of mankind, were at this time the commonly received doctrines of the wise, the learned, the pious, and the philosophical of the day.

At this time many diseases were believed to be the result of astral influence, demoniacal possession, witchcraft, sorcery, or the evil eye; and no remedies almost were adopted, or believed to be efficacious, unless they were of the nature of charms, talismans, or

means of disenchanting the patients. To this head it had been customary in these days, and even previously, to refer all diseases affecting the nervous system, as apoplexy, palsy, epilepsy, catalepsy, hysteria, chorea, convulsions; various forms of mental derangement; various emaciating diseases, as consumption, *tubercles*, *marasmus*; various painful affections, as gout and rheumatic and neuralgic disorders, and almost all pestilential distempers, which were at that time, from sundry causes, particularly prevalent.

The speculations on which these doctrines were founded, it has been usual to ascribe to Paracelsus* and his fanciful and dogmatic system. This bold and ingenious innovator, however, appears to have done no more than take advantage of the taste of the times; and perhaps he had the doubtful merit of reducing into a systematic shape the numerous popular delusions and errors, and the wild superstitions of the day. The time, indeed, possessed many Paracelsi; and the most learned men, Luther, Reuchlin, Erasmus, and Melancthon, could not thoroughly divest themselves of the prejudices peculiar to the age. The human mind was oppressed by a sort of night-mare, the features of which were at all times ugly and often terrific; and Paracelsus and his adherents endeavoured to render this vision less ugly and less frightful, by substituting images more agreeable, and beings, which, if still malevolent, veiled their evil intentions under a garb of external loveliness.

The spirit and taste of the day was indeed indicated very unequivocally in the doctrines promulgated by various philosophers or physicians, who flourished at the close of the fifteenth, and beginning of the sixteenth century, all of whom contributed more or less directly to introduce or to receive the application of cabalistical doctrines in medicine. Of these the most distinguished were Henry Cornelius Agrippa of Nettesheim, and Jerome Cardan of Pavia. The former † revived the Cabalistical doctrine of different worlds, and presiding angels, good and evil, with ideas emanating from celestial bodies, and species emanating from terrestrial bodies, and the appropriate train of occult qualities, secret relations, sympathies, and astral influence. What the latter believed or denied it is difficult to say; for his works betray such singular mixtures, so much talent, and such extravagant fancies, that they seem like the united result of great genius and mental derangement. It is clear, however, that he either pretended to believe, or did believe in magic, astrology, the influence of the constellations and planets on the virtues and vices of mankind, in the possession of a familiar spirit or genius, in the influence of evil spirits, to which he ascribes the presence of many diseases. He is also the first who maintained homœopathic doctrines. ‡

* Born 1493, died 1541. † Born 1486, died 1535 ‡ Born 1501, died 1576.

Upon all this Paracelsus refined. Admitting the Cabalistical theory in its fullest extent, he deemed all human learning except chemistry, or rather alchemy, useless, and recommended to the physician the study of the holy scriptures, especially the apocalypse. All the parts of our bodies, and all the things on earth are contained not really but virtually and spiritually in heaven; and every act performed on earth is also performed in heaven in the same manner. Besides the æons, emanations, or angels of the early Cabalists, he peopled the air with sylphs, the water with nymphs, the earth with gnomes, and the fire with salamanders, assigning thus to each of the four elements appropriate denizens and rulers. As all terrestrial bodies have their paradigmata or model-images in the region of the stars, and as diseases depend on astral influence, all that is requisite in order to cure them is to know, by the aid of the Cabala, the harmony of the stars.

To one who believed that he possessed therapeutic agents so powerful, it might appear like a work of supererogation to invoke the assistance of other agents. This, however, this great impostor did. The loadstone or magnet, he conceived, possessed remarkable properties in influencing the bodies and minds of mankind, and to that he accordingly assigned a conspicuous and important position among therapeutic agents. As Paracelsus appears here to be the first promulgator of the doctrines which were afterwards propagated by Mesmer, Puysegur, Deleuze, and many other persons, it is right to allow him to speak in his own way.

“Nec ipsi hoc considerârunt, quòd etiam magnes magnam ferri molem alliciat : et quòd ipsemet quoque homo magnes sit, et magnetis modo, velut is ferrum, sic ipse homines attrahat et illiciat. Nam hoc exemplum de preposterâ hominum consuetudine attendite. Si fors alicunde vir peregrinus, rari habitus, adveniat, certatim illi omnes affluunt, et virum extraneum spectatum accurrunt.” *

“Magnes ad se ferrum attrahit ; quia ferrum ipsius spiritum vitalem in si condit. Et tamen ejus non est cibus principalis. Similem attractivam vim in se homo quoque conditam fert, quae in uno gradu cum Magnetica vi versatur. Jam ergo homo forinsecus per vim illam ad se trahit circumstans sibi chaos. Hinc sequitur infectio aeris in homine. Hinc intelligite, quod Magnes iste spiritus vitalis in homine sit quaerens hominem infectum, si uniantur foris cum chao. Sic sani per magneticam hanc attractionem ab aegris inficiuntur. Hujus praeservationem est, infectorum aerem non attingere.” Then follows an instance of this mode of communicating disease on the one hand, and contracting it on the other. “Rem in exemplo discite. Sani oculi,

* Aureoli Philippi Theophrasti ab Hohenheim, Libri Quinque de Causis Morborum Invisibilibus, Lib. iv. Tom. i. p. 131.

si lippientes oculos inspiciant, tunc Magnes sanorum oculorum, oculorum laesorum chaos attrahit. Jam malum in sanos quoque oculos transiliit. Simile iudicium de morbis etiam caeteris. Hoc exemplum attuli, ut vim Magneticam facilius intelligeretis, quae taliter si habet."

It is almost superfluous to observe, that this doctrine, as to the transmission of diseases, is still believed by the common people and the uneducated, and is made the foundation sometimes of practical rules and observances.

Next follows another part of the magnetic hypothesis, the value of which the modern magnetic doctors will be able to appreciate.

"Una est (vis magnetica) in viris, altera in feminis. Vis Magnetica feminarum est Matrix. Illa est quae chaos attrahit, de quo dictum est. In viris vis spermatica est vis Magnetica, quae et ipsa virtus illa attractrix est ceu matrix. Quia ego hoc loco de praeservativis istius virtutis attrahentis tractare institui-mus, explicandum est quo modo fiat. Stipula ad ignem aut propius non apponenda est: aut praeservativum ita praestituendum, ut virtus attractiva insopiat. Sicut enim magnes, si quis saphyrum de collo gestet, tamdiu ad se nihil trahit, donec saphyrus it erum removeatur: ita et Carabe, et coagulatum gummi, Resina et Therebotin. Tale hic quæque praeservativum esse debet, ut *Zenexon* de Collo suspenditur."*

Afterwards he maintains that not the magnet only, but all other bodies possess the power of attraction, and also the persons of the human race.

"Quam vim Magnes in se trahendi ferri habet, ea quid aliud est, quam spiritus vitalis. Nec vero Magnes tantum attrahit verum alii quoque lapides, et ligna promiscue ad se attrahunt, hoc illud, hoc istud, &c. Hoc et animalia omnia, omnes homines trahunt: se quidem non ferrum, ut aliud. Magnes vero et Carabe experimentantur eviderent. Sic ergo duae hae virtutes pestem ab aliis hominibus attrahunt: in viris modo uno; in feminis ratione duplici."†

"Hæcce enim est vis magnetica, quae in Magnete nobis praefiguratur, ut sciamus, quomodo res visibiles virtute invisibili attrahat. Sic nostri quoque corporis membra constituuntur, ut attrahant, sibi quod convenit. Nec enim stomachus solus, sed membrum quodlibet per se, instar stomachi, cibatur invisibiliter sic stomachus visibiliter."‡

These statements, however, are mere desultory glimpses of his hypothesis, which is afterwards developed more in detail and more amply, though not more clearly, in a chapter devoted expressly to the virtues of the magnet. As in this chapter the author speaks

* Lib. II. de Peste Cap. III. op. om. T. i. p. 411.

† Fragmentum de Peste, op. omnia. T. i. p. 437.

‡ De Hydropisi, iii. op. om. i. p. 622.

with the same confidence as many of the modern magnetisers, they may be gratified by learning, that their views are supported by an authority so great and so celebrated, and that in the confident statement of these views, it is impossible for them to outdo their great prototype. The exordium is particularly fine.

“Ego ex experientia, rerum omnium magistra, unà cum ipsius Theoricâ ex experientia manânte, affirmo, Magnetem esse lapidem, cui insit, vis attractrix ferri et chalybis, prout in propatulo est: cui adde vim attractricem omnium materialium totius corporis morborum. Prisci Humoristæ multa de quatuor Humoribus nugati, turpes in medicinam errores invexerunt. Ego contrâ assero, quòd secundum Planetas morborum cognitio, quàm secundum Humores, multò expeditior sit. Interim cum illi, antiquam cantilenam pergant canere, nonnisi Humores crepant. Demonstrat id Experientia, Magnetem ad se materiales morbos omnes trahere, à loco scilicet suo ad alienum, unà cum conjunctis illis excrementis. Iam explicandum vobis est, quidnam materiales morbi sint. Hi nimirum sunt illi, quos Magnes demonstrat, dum illos instar ferri et chalybis attrahit. Ceterum illius classis morbi hi sunt: Fluxus omnes mulierum, qualescunque sint: profluvia omnia ventris: item morbus quivis, qui à centro suo in circulum dilatabilis, in centrum reduci potest: item omnis diversio fluxuum, qui à radice in ramos effundi sueverunt, ut in radice contineantur. Hæ jam sunt virtutes, quas Magneti assigno; nihil faciens cæterorum scriptorum nugas, sive illi recentes sive veteres sint.

“Sed ut institutum meum urgens, ubinam Magnes jacere debeat, explicem: hoc saltem à me admonendi estis, vt ponatis illum super centrum, ex quo morbi egrediantur. Demus exemplum. Si menstruum, si profluvium vel album, vel rubrum infestet, ponendus is est in centrum, hoc est super primas radices, ubi initium est. Ita desinet. Si diarrhœa sit, iterum imponatur centro, ubi diarrhœa incipit. Sic alvi fluor sistetur. Similiter et in cæteris morbis, per universum corpus sese diffundentibus, ultra quàm centrum comprehendit, centro illorum rursus imponi debet. Sic extra locum eum illi non efferentur. Per diversionem et attractionem eiusmodi sistuntur excrementa, et superfluitates cohibentur in suo loco, unde postea faciliè elici poseunt per naturale Emuntorium, vi debitæ medicinæ, poscente ita necessitate, coadjuvante vera digestionem. Etsi enim fluxus quidem sistatur, æger tamen ob id nondum convaluit. Hoc tamen ibi commodi est quòd in suo loco digestio perfectior fieri, et maturior effluere citra cruditatem possit. Sic etiam in colicâ cavetur, ut ne contractura sequatur. Ibi namque materia peccans conservatur in suo loco, in quo etiam digeritur, et decenti naturam ordine matura expellitur, qua tempestivâ expulsionem colica quoque et contractura simul educuntur.

“Huc summam omnem confero, quòd nullus mihi in omni me-

dicina videatur thesaurus exstare pretiosior, quàm ut morbus in suo centro cohibeatur ita, ne illud egrediatur: et postea ut Medicus peritus sit illum in suo centro digerendi et maturandi. Hoc facto, morbus naturaliter et non præternaturaliter, exire potest, sive bonus sive malus sit. Immaturum autem effluere sinere morbum velut in profluviis et Dysenteria fit, &c. id omnibus dedecori Medicis est, quòd morbos nesciant sistere in suo loco et ibidem eos maturare, et maturatos, non crudos et impræparatos expellere. Ea tamen imperitia omnibus Medicis familiaris est, quòd nec cohibere, nec digerere possint: quorum una hæc ars est, in alia parte salutem, in alia interitum procurare. Notandum præterea, eodem modo etiam hydropem in loco cohiberi ibidem digeri, et naturaliter expelli. Et licèt alii quoque in hydropisi modi sint: alius tamen fit per naturam Magnetis, alius per naturam hydropisis: ut verum maneat, medicamenta multa pro uno morbo prostare, etsi unum ab alio diversum sit. Inspiciendum ergo, quid natura, et quomodo id præstare velit possit. Et hoc non in morbis corporis tantum, sed etiam in cæteris chirurgicis observandum est. Per Magnetem enim hernia cohibetur in suo loco, et exitus sanatur. Sic per eundem ulcera antiqua et manantia retrò ad locum suum trahuntur, et tandem per genuinum emunctorium matura, non cruda, educuntur. Basis ergo rei omnis in hoc consistit, quòd per Magnetem res in suo loco cohibeatur. Postea adduntur coadjuvamenta, quæ in loco operantur, quemadmodum operari debent.*

Theophrastus had numerous followers, several of whom amplified and extended, or in various modes modified and illustrated, his doctrines and opinions. Of these, perhaps the most distinguished on the continent was Oswald Croll of Hesse†; and in this country the doctrine appears to have found supporters in Robert Fludd, Charles Irvine,‡ and William Maxwell.§

From the extracts above given it is manifest that Theophrastus did not confine himself to the idea of a real metallic magnet; that he laid it down as a doctrine peculiar to himself that all natural objects possessed magnetic properties, and were by these in-

* De Viribus Magnetis, Vol. ii. p. 177. In Herbario Theophrasti.

† Oswaldi Crollii Basihca Chemica a J. Hartmanno auctore, et a J. Michaele, Edita. Accedat Crollii de signaturis externis Rerum Tractatus. 8vo, Geneva, 1658.

‡ Medicina Magnetica; or the rare and wonderful Art of Curing by Sympathy; Laid open in Aphorisms; proved in Conclusions; and digested into an Easy Method drawn from both, &c. By C. de Iryngio, Chirurgo-Medicine in the Army. Printed in the year 1656. 12mo. The Epistle Dedicatory dated Edinburgh, June 3, 1656.

§ De Medicina Magnetica, Lib. III. In quibus tam Theoria quam Praxis continetur; Opus Novum admirabile et utilissimum, ubi multa Naturæ secretissima miracula panduntur, spiritus vitalis operationes & actenus incognitæ revelantur, totiusque hujus secretæ artis fundamenta firmissimis rationibus experientia fultis ponuntur. Auctore Gulielmo Maxwello, M. D., Scoto-Britanno, Francofurti, 1679. 12mo.

fluenced in the mutual actions on each other; and that the great object and duty of the physician was to acquire the knowledge of this subject and apply it in practice. Not only is this view fully adopted by Crollius and his other followers; but in speaking of the magnetic power and influence the most confident language is employed. It is further remarkable, that this imaginative and shadowy philosophy, which had originally been fashionable in Germany during the sixteenth century, had first raised up numerous opponents, and then enjoyed a sort of doubtful influence over the minds of a small number of speculative and dreamy men. And afterwards, when it was as a system almost extinct in Germany, it procured some enthusiastic followers in this country in the course of the following century. It is a circumstance not the least remarkable of this history of the delusions of the human mind, that Charles Irvine, the author of one of the English works on this subject, was a surgeon or medico-chirurgical officer in the army of the Parliament under George Monk, during the period of Cromwell's usurpation, and that he dedicates his book to the Right Honourable General of the Parliamentary or rather Republican forces. What taste that active and prompt-minded soldier could have had for such revelations, as the following passage discloses, it is not now possible to say. Probably his mind was too much occupied with his position and the probable state of the country, to give the contents of the work of Mr Irvine any attention.

"But before I come to handle," says Mr Irvine, "the precepts of this art, let me (as an epilogue to these conclusions, and for the better understanding of what follows), advance one proposition more, and that is this. The vital spirit is more powerfully drawn out of the whole body, and partaketh of the whole body by those things that either have the signatures of the whole body, or have a substance like the sulphur of man's body; so from a part, for a particular operation, those things do more vehemently draw, sooner communicate the spirit to another which have the evident signature of it, this I say to the end. And by thine own industry thou mayest find magnets, for every particular operation, by means of this general rule. This further I think good to gratify thee withall, of all things proceeding from the body, the blood and the sweat are most stufft with vital spirits; for of the seed I will say nothing, for without great incivility it cannot be had. But of one thing take especial heed, that as soon as they proceed from their bodie they be committed to their proper magnets; for, as the common loadstone is fortified, and after a certain manner fed with iron, so are these magnets which apprehend and keep the vital spirit untill they commit the care of them to another thing. For if thou strive to keep without their proper and due magnet, two inconveniences will follow; *first*, they cannot en-

dure any considerable time in their *esse* ; because every moment they lose somewhat of their vital spirits : *secondly*, that without a magnet they do not work so mightily ; because, for the most part, the magnets do conduce to transplantation and communication (as we know by certain experience). For philosophers they will do little or no good without a magnet ; except, peradventure, somewhat may be done by the fermentation of the blood and seed, and each is to other instead of a magnet. But in other things, though haply thou mayst find some virtue, yet thou wilt never find so powerful operations as if in thy works thou use magnets. Choose them then convenient, and apply them the right way ; and thou shalt perform wonders. *Mundus regitur opinionibus.*"

The little treatise of Mr Irvine abounds with absurd, foolish, and not very pleasant details on magnets, the mode of preparing them, and their uses and mode of administration. Yet in the end of his treatise he concludes with a passage approaching in eloquence to the style of Sir Thomas Browne, and which must make the reader regret that the talent, which could express itself in such language, was not better employed on the subjects, in which the author spent his investigation.

"This art," says he, "is called magnetick from the Magnes, (the loadstone), so called from the shepherd that found it out first in the Mount Ida, by seeing his sheep-hook armed with iron, stick fast to the magnetick stones. This is a mineral stone indued by nature with determinate points of its virtues, whereby it both draws iron to it, and disposeth the situation of the iron according to its own situation, that is, maketh the situation thereof polar. Its two great magnetisms then are, *first*, to draw iron at a distance from it to itself ; and *secondly*, to direct the situation of this iron to be polar. So it operateth without an immediate physical contaction, by a certain hidden vertue therein, which cannot be found out nor performed by elementary qualities. And for this reason we call those motions in nature magnetic, which, by a hidden consent, move locally one towards the other, or remove from the other. And after this manner of speaking, all sympathies and antipathies are called magnetick motions. This is wonderful in the loadstone that it draweth hot iron as well as cold, and doth not only communicate his vertue to iron to draw other iron, as you may see a needle taken up by the magnes, to take up another at its point, and so to proceed in others till it represent a chain ; but also hath a spiritual force which never faileth, which is in every part thereof. For, it being broke, each part hath the same vertue with the whole, which penetrateth all things, not hurting any ; for not anything hindereth its operations though placed betwixt it and its object, which work-

eth at distance, as is said, and that without a mean or middle ; for it moveth all things distant from it, though not troubling what is intermediate. Yea, it giveth that to another it hath not itself : for it giveth virtue to the needle in the compass to move to the pole, which it cannot do itself.

"This is that miracle of nature that hath defatigated the bravest wits. This is that, that directs the tallest ships in their greatest deviations or darkness. This is that, that hath been discovered in so many learned volumes. And, to conclude, this is that, that vindicates our noble art from the blemishes of vanity or superstition, and patroniseth this singular gift of the first intellect from the calumnies of the ignorant and malignant, who should not condemn, but be thankful for the revelation of great and useful mysteries. Sed 'Suum cuique ordini vulgus est, et semper optima paucissimis placuerunt.'"

The work of William Maxwell is in all respects so similar to that of Irvine, that the one must have been a translation of the other ; that is, either Irvine translated the work of Maxwell, or Maxwell translated that of Irvine. It is possible that Maxwell may have written his work first, for it was published at Frankfort in 1679 by George Frank, rector of the University of Heidelberg.

It would be tedious and unprofitable to trace the progress of these absurd and fanciful delusions, till they were gradually extinguished. It is enough to say, that Wier, in his work *de Præstigiis Dæmonum*, contributed effectually on the continent, and especially in Germany, to destroy many of these fanciful doctrines, and to show that they had no foundation except in the heated imaginations, and sometimes the fraudulent and deceitful intentions, of their defenders. One circumstance that evidently gave them greater importance than they would have otherwise obtained, was the idea that, by denying the influence of demons and their supernatural powers, it was thought that, thereby the existence and providence of God, and the whole doctrine of the immortality of the soul, were also denied. So grossly were mankind mistaken on these subjects, that even the learned and pious Henry More thought it quite indispensable to the validity of his arguments on the being and providence of God, to attempt to prove the existence and agency of demons, the truth and reality of witchcraft, and the certainty of apparitions.*

It is unnecessary here to revert to the long and dreadful struggle between reason and common sense on the one side, and ignorance and superstition on the other, in effacing the belief in demonarchy, witchcraft, magic, astrology, and sorcery. When the

* A collection of several philosophical writings of Dr Henry More, Fellow of Christ's College, Cambridge. Second edition, more correct and much enlarged. London, 1662, folio. An Antidote against Atheism. An Appendix to the foregoing.

dreadful story of Urban Grandier and the supposed possession of the nuns of Loudun in the seventeenth century, (1633, 1634,) is remembered, when it is known that in a country like France, certainly not at that time the most illiterate of Europe, it was found practicable to make an enlightened and well-informed court believe, that a number of young ladies were possessed by demons, and that these ladies so possessed were made to accuse a clergyman of the most atrocious crimes, and were at length the means of causing him to be burnt alive,—it must be less wonderful that magnetism and clairvoyance, or the art of pretending to see while the eyes are shut, or pretending to see distant scenes and transactions, are still attempted to be forced on the belief of mankind.

It was well known to all well-informed physicians, and especially since the time of the appearance of the work of John Wier, (1577,) that all these instances of pretended demoniacal possession were in truth instances of hysterical females, deceitful, prone to falsehood, often wicked, and always ready instruments in the hands of wicked and designing persons. It was even known at the time, at which the scenes of *diablerie* were enacted at Loudun, that the nuns of that establishment were hysterical, and were labouring under fits of the disease, sometimes with cataleptic seizures; that if they were possessed with any fiend, it was the fiend of lying and imposture; and that though Grandier was perhaps not the best example of a virtuous and pious ecclesiastic, these young females were wicked, debauched, and vicious to a degree scarcely credible. His chief error appears to have been imprudence and too great confidence in his personal accomplishments. Their error appears to have been a most complicated degree of iniquity, by which they lent themselves to be instruments in the accomplishment of a foul and disgraceful conspiracy against reason, common sense, and common justice and humanity.*

* It seems very doubtful whether Urban Grandier was either a person of bad principle at all, or was so worthless as he is by some represented to be. It is certain that he was a person of good figure, and who dressed so as to place his person to the best advantage. It is also allowed by his enemies that he was eloquent as a preacher, and that he insisted on the faithful making confession to their curate at Easter. In the latter circumstance he did no more than enforce the rule of the church, which was by other ecclesiastics allowed to become obsolete. His eloquence as a preacher excited the envy of less diligent or less able brethren; and when they found that his agreeable conversation with his superior external appearance rendered him popular, they imagined that as he was likely to attract the regards of the fair sex, he could not do so without being criminal. Menage states that he was accused of adultery, but does not specify the person. In 1629 he was accused of having had intercourse with females in his own church. Yet it is remarkable that no proof of either of these sins was adduced; and the accusation which eventually was made the instrument of his condemnation, was, that he was guilty of practising magic, (Aug. 1634.) Such an absurd charge was equivalent to an admission that he was innocent, for it is difficult to understand how a man could be proved guilty of a crime which has no real existence, and which is totally imaginary. Yet it shows the character of the times, that, upon this charge, he was found guilty and condemned to the stake.

Demoniacal possession, after causing the sacrifice of not a few lives, at length ceased to be a practical article of belief. Witchcraft, also, after bringing to the stake multitudes of human beings,—the weak or helpless in body, the deranged in mind, the aged, the friendless, and the imbecile—likewise had ceased to find a reception among the educated classes. Even magnetical medicine, or the alleged art of curing diseases by magnetical properties and agency, had ceased to be numbered among possible things, when it was revived by a German, half knave and half enthusiast, and, from the fanaticism of the man and the credulity and folly of the public, it attracted numerous followers. The history of this popular delusion we have often considered, and we must be satisfied with a general reference to former articles, in which the alleged claims and merits of Mesmerism are investigated.* If we have again recourse to the subject, on the occasion of the supposed cure of a serious, a tedious, and enfeebling disease by means of the influence of Mesmerism and all its train of idle mummeries and impudent impositions, it is not with the hope either of refuting the statements of its advocates or convincing them of their errors. That we believe is an idle and vain expectation. They are persons who can no more be convinced in this way than the inhabitants of a lunatic asylum. Their statements may be shown to be inconsistent with facts,—with the known principles of observation and reason. Their arguments may be shown to be fallacious, deceitful, and of no weight; but such is the construction of the minds of these persons, that they cannot perceive the difference between facts and fabrications, or the connection between premises and conclusions. When the whole procedure of any system, and all its facts and reasonings, as well as its practical applications, proceed on the idea, that the usually received facts of human observation are reversed, contradicted, and set aside, and all the established laws of thinking and observing are violated or annihilated, it is possible that the system may attract attention from its alliance and admixture with the marvellous; but it never can expect adherents and supporters among the rational, the intelligent, or those who place confidence in the deductions of observation and reasoning.

Neither can we allow that to this subject we give a little pre-

It may be justly argued that, had he been guilty of any real crime, that, and not an imaginary one, would have been made the subject of accusation.

An account of the conspiracy, as it may be called, against Urban Grandier, is given in the Dictionary of Bayle, (article Grandier and Loudun), in the Causes Celebres, and in the 71st and 72d numbers of the Looker-on, where the story is told in a very interesting manner. (British Essays by Chalmers, Vol. xxvii.) See also a small work published at Amsterdam in 1693, entitled *Histoire des Diables de Loudun*.

* See especially article on Mr Colquhoun's work, in vol. xl.; and article on Colquhoun, Lee, and Dupotet, in vol. l. p. 469.

sent attention, in consequence of the character of the personage who forms its subject, or because the narrative produced by that lady is the most interesting or the most important testimony that could be or has been adduced. Multiplied testimonies have been given, quite as interesting, equally important, and equally capable of making an impression on candid minds. Yet this impression they have failed to make. In the present narrative, indeed, there is nothing peculiar. A lady labours under disease in the uterus, a circumstance of daily occurrence. She gets out of health,—also a common occurrence. She becomes nervous, fanciful, feeble in body and imbecile in mind,—also common occurrences;—for all of us are liable to become so under the hand of the Supreme Ruler of events. Partly under the disease, and partly under the treatment, her mind becomes still more enfeebled. She is nervous, hysterical, cataleptic, somnambulous; and in this condition is visited by a mesmeriser, who kindles up into active conflagration the smouldering fancies of her distempered brain. In all this there is nothing new; nothing extraordinary, and nothing wonderful. The same scene has been enacted 600 times, and will be enacted 600 times more before the present century is finished. The case of Miss Martineau is not in any respect more wonderful than the cases given by Joseph Frank, the cases of those nice young women, the Okeys, or the cases of any other half-dozen, or half-a score of hysterical females.

We say, then, that it is not from anything new, unusual, interesting, or important, that we bestow a little passing consideration on this case; but because all the facts and illustrations which we have already repeatedly brought before the public, are unknown, forgotten, or overlooked, and because it is requisite that they should be again set before them in proper and becoming, if not new and forcible lights, that we now think it necessary to spend a little time on the subject in general.

“It is important to society,” says Miss Martineau, “to know whether Mesmerism is true. The revival of its pretensions from age to age makes the negative of this question appear so improbable, and the affirmative involves anticipations so vast, that no testimony of a conscientious witness can be unworthy of attention. I am now capable of affording testimony; and all personal considerations must give way before the social duty of imparting the facts of which I am in possession.

“Those who know Mesmerism to be true from their own experience are now a large number; many more, I believe, than is at all supposed by those who have not attended to the subject. Another considerable class consists of those who believe upon testimony: who find it impossible not to yield credit to the long array of cases in many books, and to the attestation of friends whose judgment and veracity they are in the habit of respecting. After these there

remain a good many who amuse themselves with observing some of the effects of Mesmerism, calling them strange and unaccountable, and then going away and thinking no more about them; and lastly, the great majority who know nothing of the matter, and are so little aware of its seriousness as to call it a 'bore,' or to laugh at it as nonsense or a cheat.

"If nonsense, it is remarkable that those who have most patiently and deeply examined it, should be the most firmly and invariably convinced of its truth. If it is a cheat, it is no laughing matter. If large numbers of men can, age after age, be helplessly prostrated under such a delusion as this, under a wicked influence so potential over mind and body, it is one of the most mournful facts in the history of man."—Pp. 1-2.

Miss Martineau, we are sorry to observe, seems, by this remark, to be very imperfectly acquainted with the history of human delusion, or the history of man either. That the pretensions of Mesmerism are believed by many otherwise respectable persons, is not by any means the most mournful fact in the history of man. At all events we could mention, at least, half-a-dozen facts infinitely more mournful in the history of this extraordinary character. Was the delusion of Eve by Satan not a much more mournful fact? Was the folly and wickedness of the Israelites in adopting the ox and calf worship of the Egyptians, after they had been taught for ages to worship the one living and true God, not a much more mournful delusion? And were not the frequent relapses of this people, and their strange love for the worship of all the gods of the surrounding nations, the heliolatry of the Persians, the boölatry of the Indians and Egyptians, the ophiolatry or serpent worship of the Egyptians, the worship of Adonis, and in short the worship of every thing, that was, or had been worshipped by other people, proofs of a much more mournful delusion? Is not the conversion of the Eucharist into a victim or sacrifice by the Roman Catholic church, and the worship of this victim,—all in direct opposition to the express injunctions of scripture,—are not Mariolatry, staurolatry, and all the other ceremonies of human invention and institution, received, sanctioned, and enforced by the Roman Catholic Church,—much more mournful instances of human delusion? Lastly, is there any thing worse in the belief in demoniacal possession, or witchcraft, or any other strong delusion, than what we find in the pretensions of Mesmerism? Surely if Miss Martineau had given but a very moderate attention to the history of the human mind in different ages,—that attention which any person of very moderate reading may give,—she never could have made a statement,—she never could have drawn a conclusion, showing so little knowledge of the subject as the one now referred to.

Miss Martineau proceeds with her confessions.

"For some years before June last, I was in the class of believers

upon testimony. I had witnessed no mesmeric facts whatever ; but I could not doubt the existence of many which were related to me without distrusting either the understanding, or the integrity, of some of the wisest and best people I knew. Nor did I find it possible to resist the evidence of books, of details of many cases of protracted bodily and mental effects. Nor, if it had been possible, could I have thought it desirable or philosophical to set up my negative ignorance of the functions of the nerves and the powers of the mind, against the positive evidence of observers and recorders of new phenomena. People do not, or ought not, to reach my years without learning that the strangeness and absolute novelty of facts attested by more than one mind is rather a presumption of their truth than the contrary, as there would be something more familiar in any devices or conceptions of men ; that our researches into the powers of nature, of human nature with the rest, have as yet gone such a little way that many discoveries are yet to be looked for ; and that, while we have hardly recovered from the surprise of the new lights thrown upon the functions and texture of the human frame by Harvey, Bell, and others, it is too soon to decide that there shall be no more as wonderful, and presumptuous in the extreme to predetermine what they shall or shall not be.

This passage makes us almost ashamed that we have entered into any serious examination of these letters. From the passage now quoted, it is perfectly clear, that Miss Martineau does not possess the knowledge requisite to enable her to give judgment, or even to give evidence on a question so complicated and obscure as the present. We say it with all respect to a lady of talent and information, that when any one talks of " Harvey, Bell, and others," it is a clear proof that the person so expressing himself or herself, has not very distinct or accurate ideas on the respective merits of Harvey, Bell, and others.

" Such was the state of my mind on the subject of Mesmerism six years ago, when I related a series of facts on the testimony of five persons whom I could trust, to one whose intellect I was accustomed to look up to, though I had had occasion to see that great discoveries were received or rejected by him on other grounds than the evidence on which their pretensions rested. He threw himself back in his chair when I began my story, exclaiming, ' Is it possible that you are bit by that nonsense ? ' On my declaring the amount of testimony on which I believed what I was telling, he declared, as he frequently did afterwards, that if he saw the incidents himself, he would not believe them ; he would sooner think himself and the whole company mad than admit them. This declaration did me good ; though, of course, it gave me concern. It showed me that I must keep my mind free, and must observe and decide independently, as there could be neither help nor hindrance from minds self-exiled in this way from the region of evidence. From that time

till June last, I was, as I have said, a believer in Mesmerism on testimony."

Next comes the history of the symptoms for which Mesmerism was to be tried.

"The reason why I did not qualify myself for belief or disbelief on evidence was a substantial one. From the early summer of 1839, I was, till this autumn, a prisoner from illness. My recovery now, by means of mesmeric treatment alone, has given me the most thorough knowledge possible that Mesmerism is true.

"This is not the place in which to give any details of disease. It will be sufficient to explain briefly, in order to render my story intelligible, that the internal disease, under which I have suffered, appears to have been coming on for many years; that after warnings of failing health, which I carelessly overlooked, I broke down, while travelling abroad in June 1839;—that I sank lower and lower for three years after my return, and remained nearly stationary for two more, preceding last June. During these five years I never felt wholly at ease for one single hour. I seldom had severe pain; but never entire comfort. A besetting sickness, almost disabling me from taking food for two years, brought me very low; and, together with other evils, it confined me to a condition of almost entire stillness,—to a life passed between my bed and my sofa. It was not till after many attempts at gentle exercise that my friends agreed with me that the cost was too great for any advantage gained: and at length it was clear that even going down one flight of stairs was imprudent. From that time, I lay still; and by means of this undisturbed quiet, and such an increase of opiates as kept down my most urgent discomforts, I passed the last two years with less suffering than the three preceding. There was, however, no favourable change in the disease. Everything was done for me that the best medical skill and science could suggest, and the most indefatigable humanity and family affection devise: but nothing could avail beyond mere alleviation. My dependence on opiates was desperate. My kind and vigilant medical friend,—the most sanguine man I know, and the most bent upon keeping his patients hopeful,—avowed to me last Christmas, and twice afterwards, that he found himself compelled to give up all hope of affecting the disease,—of doing more than keeping me up, in collateral respects, to the highest practicable point. This was no surprise to me; for when any specific medicine is taken for above two years without affecting the disease, there is no more ground for hope in reason than in feeling. In June last, I suffered more than usual, and new measures of alleviation were resorted to. As to all the essential points of the disease, I was never lower than immediately before I made trial of Mesmerism.

"If, at any time during my illness, I had been asked, with serious purpose, whether I believed there was no resource for me, I should have replied that Mesmerism might perhaps give me partial

relief. I thought it right—and still think it was right—to wear out all other means first. It was not, however, for the reason that the testimony might be thus rendered wholly unquestionable,—though I now feel my years of suffering but a light cost for such result ;—it was for a more personal reason that I waited. Surrounded as I was by relations and friends, who, knowing nothing of Mesmerism, regarded it as a delusion or an imposture,—tenderly guarded and cared for as I was by those who so thought, and who went even further than myself in deference for the ordinary medical science and practice, it was morally impossible for me to entertain the idea of trying Mesmerism while any hope was cherished from other means.

“ If it had not been so, there was the difficulty that I could not move, to go in search of aid from Mesmerists ; and to bring it hither while other means were in course of trial was out of the question. After my medical friend’s avowal of his hopelessness, however, I felt myself not only at liberty, but in duty bound, to try, if possible, the only remaining resource for alleviation. I felt then, and I feel now, that through all mortification of old prejudices, and all springing up of new, nobody in the world would undertake to say I was wrong in seeking even recovery by any harmless means, when every other hope was given up by all : and it was not recovery that was in my thoughts, but only solace. It never presented itself to me as possible that disease so long and deeply fixed could be removed ; and I was perfectly sincere in saying, that the utmost I looked for was release from my miserable dependence on opiates. Deep as are my obligations to my faithful and skilful medical friend, for a long course of humane effort on his part, no one kindness of his has touched me so sensibly as the grace with which he met my desire to try a means of which he had no knowledge or opinion, and himself brought over the Mesmerist under whom the first trial of my susceptibility was made.

“ Last winter I wrote to two friends in London, telling them of my desire to try Mesmerism, and entreating them to be on the watch to let me know if any one came this way of whose aid I might avail myself. They watched for me ; and one made it a business to gain all the information she could on my behalf ; but nothing was actually done, or seemed likely to be done, when in June a sudden opening for the experiment was made, without any effort of my own, and on the 22d I found myself, for the first time, under the hands of a Mesmerist.

“ It all came about easily and naturally at last. I had letters,—several in the course of ten days,—one relating a case in which a surgeon, a near relative of mine, had, to his own astonishment, operated on a person in the mesmeric sleep without causing pain ;—one from an invalid friend, ignorant of Mesmerism, who suggested it to me as a *pis aller* ;—and one from Mr and Mrs Basil Montagu, who, supposing me an unbeliever, yet related to me the case of Ann Vials, and earnestly pressed upon me the expediency of a trial :—and, at the same time, Mr Spencer T. Hall being at Newcastle lecturing, my medical friend went out of curiosity, was im-

pressed by what he saw, and came to me very full of the subject. I told him what was in my mind ; and I have said above with what a grace he met my wishes, and immediately set about gratifying them

" At the end of four months I was, as far as my own feelings could be any warrant, quite well. My Mesmerist and I are not so precipitate as to conclude my disease yet extirpated, and my health established beyond all danger of relapse ; because time only can prove such facts. We have not yet discontinued the mesmeric treatment, and I have not re-entered upon the hurry and bustle of the world. The case is thus not complete enough for a professional statement. But, as I am aware of no ailment, and am restored to the full enjoyment of active days and nights of rest, to the full use of my powers of body and mind ; and as many invalids, still languishing in such illness as I have recovered from, are looking to me for guidance in the pursuit of health by the same means, I think it right not to delay giving a precise statement of my own mesmeric experience, and of my observation of some different manifestations in the instance of another patient in the same house. A further reason against delay is, that it would be a pity to omit the record of some of the fresh feelings and immature ideas which attend an early experience of mesmeric influence, and which it may be an aid and comfort to novices to recognise from my record. And again, as there is no saying in regard to a subject so obscure, what is trivial and what is not, the fullest detail is likely to be the wisest ; and the earlier the narrative the fuller, while better knowledge will teach us hereafter what are the non-essentials that may be dismissed"—Pp. 3-7.

The following part of the story, prudence might suggest, should not have been published. For the conclusions to be drawn from it are not favourable to the narrator as a dispassionate and competent witness.

" On Saturday, June 22d, Mr Spencer Hall and my medical friend came, as arranged, at my worst hour of the day, between the expiration of one opiate and the taking of another. By an accident the gentlemen were rather in a hurry,—a circumstance unfavourable to a first experiment. But result enough was obtained to encourage a further trial, though it was of a nature entirely unanticipated by me. I had no other idea than that I should either drop asleep or feel nothing. I did not drop asleep, and I did feel something very strange. Various passes were tried by Mr Hall ; the first that appeared effectual, and the most so for some time after, were passes over the head, made from behind,—passes from the forehead to the back of the head, and a little way down the spine. A very short time after these were tried, and twenty minutes from the beginning of the *séance*, I became sensible of an extraordinary appearance, most unexpected, and wholly unlike anything I had ever conceived of. Something seemed to diffuse itself through the atmosphere,—

not like smoke, nor steam, nor haze,—but most like a clear twilight, closing in from the windows and down from the ceiling, and in which one object after another melted away, till scarcely anything was left visible before my wide-open eyes. First, the outlines of all objects were blurred; then a bust, standing on a pedestal in a strong light, melted quite away; then the opposite bust; then the table with its gay cover, then the floor, and the ceiling, till one small picture, high up on the opposite wall, only remained visible,—like a patch of phosphoric light. I feared to move my eyes, lest the singular appearance should vanish; and I cried out, ‘O! deepen it! deepen it!’ supposing this the precursor of the sleep. It could not be deepened, however; and when I glanced aside from the luminous point, I found that I need not fear the return of objects to their ordinary appearance while the passes were continued. The busts reappeared, ghost-like, in the dim atmosphere, like faint shadows, except that their outlines, and the parts in the highest relief, burned with the same phosphoric light. The features of one, an Isis with bent head, seemed to be illumined by a fire on the floor, though this bust has its back to the windows. Wherever I glanced, all outlines were dressed in this beautiful light; and so they have been, at every *séance*, without exception, to this day; though the appearance has rather given way to drowsiness since I left off opiates entirely. This appearance continued during the remaining twenty minutes before the gentlemen were obliged to leave me. The other effects produced were, first, heat, oppression and sickness, and, for a few hours after, disordered stomach; followed, in the course of the evening, by a feeling of lightness and relief, in which I thought I could hardly be mistaken.”—Pp. 7-8.

The mind of Miss Martineau was in the state of transition from doubt and denial to belief and acknowledgment. Yet in what state do the facts here detailed show her mind, her judgment, and her observation to have been. Certainly, if we are to trust all testimony, and apply it from one or more cases to others, we must conclude that her mind was not in that state in which the mind of a competent observer ought to be. With the causes of this we have nothing to do; but it is quite clear that the person who saw the lights and felt the sensations described in the previous paragraph, was in a condition totally unfit for making correct observations. She appears to have been put in a state of somnambulism, or quietism, not dissimilar to that of the monks of Mount Athos, with her corporeal eyes shut and the eyes of the fancy open, so as to furnish forth a species of diorama of all things near and remote. Then follows the transition.

“On occasions of a perfectly new experience, however, scepticism and self-distrust are very strong. I was aware of this beforehand, and also, of course, of the common sneer—that mesmeric effects are ‘all imagination.’ When the singular appearances presented themselves, I thought to myself,—‘Now, shall I ever believe that this was all fancy? When it is gone, and when people laugh, shall I

ever doubt having seen what is now as distinct to my waking eyes as the rolling waves of yonder sea, or the faces round my sofa?' I did a little doubt it in the course of the evening: I had some misgivings even so soon as that; and yet more the next morning, when it appeared like a dream.

"Great was the comfort, therefore, of recognising the appearances on the second afternoon. 'Now,' thought I, 'can I again doubt?' I did, more faintly; but, before a week was over, I was certain of the fidelity of my own senses in regard to this, and more.

"There was no other agreeable experience on this second afternoon. Mr Hall was exhausted and unwell, from having mesmerised many patients; and I was more oppressed and disordered than on the preceding day, and the disorder continued for a longer time; but again, towards night, I felt refreshed and relieved. How much of my ease was to be attributed to Mesmerism, and how much to my accustomed opiate, there was no saying, in the then uncertain state of my mind."—Pp. 8-9.

Next comes a new performer on the stage, with complete conviction and consequent conversion.

"The next day, however, left no doubt. Mr Hall was prevented by illness from coming over, too late to let me know. Unwilling to take my opiate while in expectation of his arrival, and too wretched to do without some resource, I rang for my maid, and asked whether she had any objection to attempt what she saw Mr Hall do the day before. With the greatest alacrity she complied. Within one minute the twilight and phosphoric lights appeared; and in two or three more, a delicious sensation of ease spread through me,—a cool comfort, before which all pain and distress gave way, oozing out, as it were, at the soles of my feet. During that hour, and almost the whole evening, I could no more help exclaiming with pleasure than a person in torture crying out with pain. I became hungry, and ate with relish, for the first time for five years. There was no heat, oppression, or sickness during the *séance*, nor any disorder afterwards. During the whole evening, instead of the lazy hot ease of opiates, under which pain is felt to lie in wait, I experienced something of the indescribable sensation of health, which I had quite lost and forgotten. I walked about my rooms, and was gay and talkative. Something of this relief remained till the next morning; and then there was no reaction. I was no worse than usual; and perhaps rather better.

"Nothing is to me more unquestionable and more striking about this influence than the absence of all reaction. Its highest exhilaration is followed, not by depression or exhaustion, but by a further renovation. From the first hour to the present, I have never fallen back a single step. Every point gained has been steadily held. Improved composure of nerve and spirits has followed upon every mesmeric exhilaration. I have been spared all the weaknesses of convalescence, and carried through all the usually formidable enterprises of return from deep disease to health with a steadiness

and tranquillity astonishing to all witnesses. At this time, before venturing to speak of my health as established, I believe myself more firm in nerve, more calm and steady in mind and spirits, than at any time of my life before. So much, in consideration of the natural and common fear of the mesmeric influence as pernicious excitement,—as a kind of intoxication.”—Pp. 9-10.

After this, by the advice of Mr Hall, mistress and maid carried on the mesmerising process for six weeks. In four days only during that time were the operations prevented by visitors or other accidents; and on these four days only the old pain and distress returned, but never on the days on which Miss Martineau was mesmerised. During this time also not only was the state of the patient in general improved, but the amount of the opiates administered was undergoing “gradual reduction.” The patient then began to entertain hopes of recovery; and, in a few weeks more, she adds, this hope was completely confirmed.

After this time, however, a new difficulty presented itself. Though the servant did, as a mesmerist, whatever good will and affection could accomplish, still it appears that, for the necessities of such a case, a mesmerist of more exalted qualifications was required. This was also procured, we are told, in a lady, the widow of a clergyman, possessed of great mesmeric power, (what is this power, and by what marks or signs is its possession or presence to be recognized?) and of those high qualities of mind and heart which fortify and sanctify its influence. In pure zeal and benevolence this lady came to the patient, and has been with her ever since. When the patient found herself able to repose in the knowledge and power, mental and moral, of this new performer, the last impediments to her progress were cleared away, and recovery, we are assured, advanced accordingly.

The results of the performance of this new operator are next detailed.

“Under her hands the visual appearances and other immediate sensations were much the same as before; but the experience of recovery was more rapid. I can describe it only by saying, that I felt as if my life were fed from day to day. The vital force infused or induced was as clear and certain as the strength given by food to those who are faint from hunger. I am careful to avoid theorising at present on a subject which has not yet furnished me with a sufficiency of facts; but it can hardly be called theorising to say (while silent as to the nature of the agency) that the principle of life itself—that principle which is antagonistic to disease—appears to be fortified by the mesmeric influence; and thus far we may account for Mesmerism being no specific, but successful through the widest range of diseases that are not hereditary, and have not caused disorganization. No mistake about Mesmerism is more prevalent than the supposition that it can avail only in nervous diseases.

The numerous cases recorded of cure of rheumatism, dropsy, cancer, and the whole class of tumours,—cases as distinct, and almost as numerous as those of cure of paralysis, epilepsy, and other diseases of the brain and nerves, must make any inquirer cautious of limiting his anticipations and experiments by any theory of exclusive action on the nervous system. Whether Mesmerism, and, indeed, any influence whatever, acts exclusively through the nervous system, is another question.

“A few days after the arrival of my kind Mesmerist, I had my foot on the grass for the first time for four years and a half. I went down to the little garden under my windows. I never before was in the open air, after an illness of merely a week or two, without feeling more or less overpowered; but now, under the open sky, after four years and a half spent between bed and a sofa, I felt no faintness, exhaustion, or nervousness of any kind. I was somewhat haunted for a day or two by the stalks of the grass, which I had not seen growing for so long (for, well supplied as I had been with flowers, rich and rare, I had seen no grass, except from my windows); but, at the time, I was as self-possessed as any walker in the place. In a day or two, I walked round the garden, then down the lane, then to the haven, and so on, till now, in two months, five miles are no fatigue to me. At first, the evidences of the extent of the disease were so clear as to make me think that I had never before fully understood how ill I had been. They disappeared, one by one; and now I feel nothing of them.

“The same fortifying influence carried me through the greatest effort of all,—the final severance from opiates. What that struggle is, can be conceived only by those who have experienced, or watched it with solicitude in a case of desperate dependence on them for years. No previous reduction can bridge over the chasm which separates an opiated from the natural state. I see in my own experience a consoling promise for the diseased, and also for the intemperate, who may desire to regain a natural condition, but might fail through bodily suffering. Where the mesmeric sleep can be induced, the transition may be made comparatively easy. It appears, however, that opiates are a great hindrance to the production of the sleep; but even so, the mesmeric influence is an inestimable help, as I can testify. I gave all my opiates to my Mesmerist, desiring her not to let me have any on any entreaty: and during the day I scarcely felt the want of them. Her mesmerising kept me up; and, much more, it intercepted the distress,—obviated the accumulation of miseries under which the unaided sufferer is apt to sink. It enabled me to encounter every night afresh,—acting as it does in cases of insanity, where it is all-important to suspend the peculiar irritation—to banish the haunting idea. What further aid I derived in this last struggle from Mesmerism in another form, I shall mention when I detail the other case with which my own became implicated, and in which, to myself at least, the interest of my own has completely merged.”—Pp. 12–14.

These statements relate chiefly to general effects on the health

and strength of the sufferer. But we find afterwards the same descriptions of inconceivable lights, colours, and objects, and the same play of the fancy.

"The first very striking circumstance to me, a novice, though familiar enough to the practised, was the power of my mesmerist's volitions, without any co-operation on my part. One very warm morning in August, when everybody else was oppressed with heat, I was shivering a little under the mesmeric influence of my maid,—the influence, in those days, causing the sensation of cold currents running through me, from head to foot. 'This cold will not do for you ma'am,' said M. 'O!' said I, 'it is fresh, and I do not mind it:' and immediately my mind went off to something else. In a few minutes I was surprised by a feeling as of warm water trickling through the channels of the late cold. In reply to my observation, that I was warm now, M. said 'Yes, ma'am, that is what I am doing.' By inquiry and observation, it became clear to me, that her influence was, generally speaking, composing, just in proportion to her power of willing that it should be so. When I afterwards saw, in the case I shall relate, how the volition of the Mesmerist caused immediate waking from the deepest sleep, and a supposition that the same glass of water was now wine—now porter, &c., I became too much familiarised with the effect to be as much astonished as many of my readers will doubtless be.

"Another striking incident occurred in one of the earliest of my walks. My Mesmerist and I had reached a headland nearly half a mile from home, and were resting there, when she proposed to mesmerise me a little—partly to refresh me for our return, and partly to see whether any effect would be produced in a new place, and while a fresh breeze was blowing. She merely laid her hand on my forehead, and, in a minute or two, the usual appearances came, assuming a strange air of novelty from the scene in which I was. After the blurring of the outlines, which made all objects more dim than the dull gray day had already made them, the phosphoric lights appeared, glorifying every rock and headland, the horizon, and all the vessels in sight. One of the dirtiest and meanest of the steam tugs in the port was passing at the time, and it was all dressed in heavenly radiance—the last object that any imagination would select as an element of a vision. Then, and often before and since, did it occur to me that if I had been a pious and very ignorant Catholic, I could not have escaped the persuasion that I had seen heavenly visions. Every glorified object before my open eyes would have been a revelation: and my Mesmerist, with the white halo round her head, and the illuminated profile, would have been a saint or an angel.

"Sometimes the induced darkening has been so great, that I have seriously inquired whether the lamp was not out, when a few movements of the head convinced me that it was burning as brightly as ever. As the muscular power oozes away under the mesmeric influence, a strange inexplicable feeling ensues of the frame becoming

transparent and ductile. My head has often appeared to be drawn out, to change its form, according to the traction of my Mesmerist ; and an indescribable and exceedingly agreeable sensation of transparency and lightness, through a part or the whole of the frame, has followed. Then begins the moaning, of which so much has been made, as an indication of pain. I have often moaned, and much oftener have been disposed to do so, when the sensations have been the most tranquil and agreeable. At such times, my Mesmerist has struggled not to disturb me by a laugh, when I have murmured, with a serious tone, ' Here are my hands, but they have no arms to them : ' ' O dear ! what shall I do ? here is none of me left ! ' the intellect and moral powers being all the while at their strongest. Between this condition and the mesmeric sleep there is a state, transient and rare, of which I have had experience, but of which I intend to give no account. A somnambule calls it a glimmering of the lights of somnambulism and clairvoyance. To me there appears nothing like glimmering in it. The ideas that I have snatched from it, and now retain, are, of all ideas which ever visited me, the most lucid and impressive. It may be well that they are incommunicable—partly from their nature and relations, and partly from their unfitness for translation into mere words. I will only say that the condition is one of no ' nervous excitement,' as far as experience and outward indications can be taken as a test. Such a state of repose, of calm translucent intellectuality, I had never conceived of ; and no reaction followed, no excitement but that which is natural to every one who finds himself in possession of a great new idea."—Pp. 14-16.

As illustrations of a particular state of the mind, the fancy, and the external senses, these descriptions are important documents. They show the possibility of a human being having her external senses shut, as it were, on the external world, and either the fancy furnishing, as it were, new scenes and objects of its own creation, or modifying very powerfully the slight impressions of external objects. It indicates a sort of dreamy condition, in which neither the external senses are able or sufficiently active to control the powers of fancy or to correct its errors and delusions ; nor is the judgment sufficiently awake or firm to control the operations thus induced by imagination. As an illustrative history of psychological operations, the statement is valuable. As a piece of medical or therapeutic information, it is naught.

By this time it appears Miss Martineau had so far recovered from the illness under which she had laboured for four years and a half, that it was natural to infer, that her health might be in a great degree reestablished, and she might remain in comparative health for several years. But what was the disorder by which so much weakness and misery was induced ? Was it a dynamic or an organic disease ? Was it a disorder which requires time for removal, or any peculiar treatment ? Or was it an affection which might be

expected to subside as the general health of the individual began to improve?

On these questions much satisfactory information is communicated in the tract of Mr Greenhow. It appears that in June 1839, when at Venice, Miss Martineau began first to labour under symptoms which denoted the presence of very considerable uterine irritation, accompanied with some hemorrhage; associated probably with some degree of procidentia or prolapsus. In July 1839, when she was at Newcastle, it was ascertained that the uterus was enlarged, and that retroversion to some extent had ensued. A polypus was also recognised and removed. Besides this, the functions of the bowels, and indeed of the whole alimentary canal, appeared to have been thoroughly deranged. The aching pain in the back, which was so distressing, was evidently a symptomatic effect of the morbid state of the womb.

The main question, therefore, which the practitioner had to propose to himself was, is this a disease which necessarily leads to disorganizing effects or not, is susceptible of relief, or may be made to subside under any means of treatment? It was the opinion both of Sir C. M. Clarke, and also of Mr Greenhow, that it did not necessarily lead to disorganizing effects, and that it did admit of a certain degree of relief, and even that, judging from the results of other cases, it might subside.

Certain remedial measures were accordingly prescribed; rest in the horizontal position, regulation of the alimentary canal, the application of iodine ointment, and the internal use of ioduret of iron. Under the use of these means a certain amount of amelioration was obtained.

On the 6th of December 1844, after great improvement in the general health had taken place, as already stated, while the mesmeric treatment was proceeding, the following state of the parts forming the original seat of the disease was recognised by Mr Greenhow.

"The *fundus uteri* is more disengaged than at the last examination, and admits of being raised somewhat higher. It is certainly *less fixed*, and in this respect has improved at each time of examination since April 2d 1844, when the first degree of improvement was observed. The retroversion continues, the fundus still extending towards the sacrum, while the *os uteri* approaches the pubes; the organ remains large and firm, and is yet turned back nearly at a right angle from the *cervix uteri*. The two membranous pedicles remain hanging out of the *os uteri* as at last examination (4th September 1844). The health is represented as quite good, and the catamenia as regular; the nervous pains and irritations having all subsided. The person is less; but as abdominal distension depended principally upon the gaseous and other contents of the intestines, and in a slight degree only on the uterine tumour, it is probable that renewed habits

of activity have greatly contributed to restore the symmetry of the person in this respect."

From these facts, obtained by observation and examination, Mr Greenhow deduced certain inferences regarding the probable termination of the disease, under which his patient was labouring. These inferences are given in the following passages.

"Knowing well that no symptoms of malignant disease of the affected organ existed, I always believed that a time would arrive when my patient would be relieved from most of her distressing symptoms, and released from her long continued confinement. The catamenial crisis appeared the most probable period, but I did not despair of this happening sooner: though she never willingly listened to my suggestions of the probability of such prospective events, and seemed always best satisfied with anything approaching to an admission that she must ever remain a secluded invalid. This state of mind perhaps, may be considered as an additional symptom of the morbid influence over the nervous system, of the class of diseases in which this case must be included.

"During the last year or two, in common with many of the friends of Miss M., I had frequent opportunities of observing the increased ease and freedom with which she moved about her sitting-room; and my conviction became confirmed, that the time was approaching when she would resume her habits of exercise in the open air. Oftener than once I have made use of the somewhat strong expression, that some day, probably before long, Miss M. would take up her bed and walk.

"In the history of this case it is probable that the advocates of mesmerism will find reasons and arguments in support of their opinions. But the experienced practitioner, carefully distinguishing the *post hoc* from the *propter hoc*, will have little difficulty in bringing the whole into harmony with the well-established laws of human physiology.

"As regards the pathology of the case, he will conclude that the condition of the uterus in December is but the natural sequel of progressive improvement begun in, or antecedent to, the month of April; and as regards the relief from the distressing nervous symptoms connected therewith, that the time had arrived when a new and powerful stimulus only was required, to enable the enthusiastic mind of my patient to shake them off.

"After bestowing my best consideration on the subject, this is the conclusion which most strongly forces itself on my own mind."
—Pp. 22-24.

These inferences appear to us to be very nearly what any intelligent medical practitioner would have drawn from the facts which had become known to him. If he had either by observation continued for some time, or by repeated examination satisfied himself, that the disease under which his patient was labouring, did not possess in itself any malignant or disorganising tendency, —if he was satisfied that it did not betray any symptoms of depend-

ing upon the presence of some heterologous deposit, then the next question which he had to consider was, whether it was of that nature, that, under the use of proper remedies and proper treatment, general, dietetic, and personal, it might either be much diminished, or might gradually disappear. Now the case appears, like all others in which the uterus is the seat of disorder, to have been complicated. There was hypertrophy of the uterus, connected probably with vascular congestion; there was retroversion of the organ as the mechanical effect of the overloaded state of its vessels and its unusual enlargement; there were nervous disorders, sense of sinking and debility, partly as the effect of this, partly as the effect of a disordered state of the alimentary canal. There was aching or racking pain of the back, as the effect of the uterine disease,—one of the most excruciating and enfeebling states to which the female is liable, and which arises from the reflected action of the irritated uterine nerves on the spinal chord, as well as on the muscles of the back and loins. Then there was very manifest disorder of the alimentary canal. Strictly speaking, there was no organic disease of the *uterus*; there was no heterologous growth, no malignant tumour, no fibrous tumour even; and nothing but small polypi, most likely enlarged follicles at the neck or orifice of the organ. Here, therefore, there was no insurmountable impediment to recovery; and we know that, humanly speaking, if proper measures be seasonably adopted and persevered in firmly and decidedly, there is every reason to believe that, in cases of this description, recovery will ensue. It is indeed only a question of time. What cannot be accomplished in two or three months may be completed in six; what cannot be done in six months may be performed in twelve; and if even this time be insufficient, in the course of two or three years, proper management has been known to effect beneficial changes.

It appears, therefore, that in this case nothing has occurred which might not have been expected,—nothing which does not occur in other similar cases,—and nothing which will not occur again in similar cases. Perfect rest in the horizontal position, local bleeding, the use of opiates, due regulation of the bowels, tonics, these were the means employed; and it is well known that, if persevered in judiciously and steadily, much good may often be thus effected. The only part of the treatment, the perfect propriety of which might be doubted or contested, is that of the opiates. These agents, powerful as they are in allaying irritation and alleviating pain, always induce a low depressed state of the nervous system, and when long continued, they do seem to operate as a slow poison. On the other hand, in painful and irritative disorders, they afford most effectual aid, and, when judiciously managed, may be the means of producing much benefit. Then, as we conceive that no one has a right to say whether opiates

will be beneficial or detrimental in any given case, without seeing the case, and as the medical attendant must ever be allowed to exercise his discretion in this matter, it would be wrong to say, that even in this case they either did harm, or might have been dispensed with.

But, retorts the Mesmerist, the patient was not cured by the medical treatment. She was feeble, languid, nervous, totally unable to move; could neither digest food nor be nourished by it, until she was mesmerised. After medical treatment continued for four years, it left her where it found her; and was obliged to confess its own impotency. Then came mesmerism and the mesmerist; and, as if by magic, raised the patient at once from bed and sofa, gave her appetite, enabled her food to nourish her, restored her strength, and, in short, placed her in that state of health and vigour, in which medicine acknowledged its inability to do the like.

To this it must be answered, that much of the state of the patient when the mesmerist began his performances was attributable to the prolonged use of opiates, to the nervous debility thereby occasioned, and much was owing to the debility induced by long confinement, the abandonment of active habits, and doubtless also the despondent state of the mind of the patient. We know that the mesmerist will deny these inferences, and especially the latter, and maintain that there was no mental depression. This, however, will not serve the cause. For it is certain that not only is the mind depressed in all cases of long continued illness with confinement; but it is particularly so in cases of uterine disorder. It is further certain, from the statement given by Mr Greenhow in p. 492, that the mind was, in this particular case, in a very depressed state, at the prospect of being a secluded invalid for life. The great use of the mesmerism in this case, for we do not deny that it was of some use, was that it made on the mind new impressions, changed the current of thought from internal reflex operations to some others of less gloomy character, furnished a new sort of excitement to the imagination, and thus enabled the natural powers of the system to do the rest.

The main question here is, could this change have been effected by other means than those employed? This must be answered conditionally in the affirmative. That is to say, we see frequently cases of the same character as that of Miss Martineau, in which the same beneficial changes, so far as we are enabled to judge, are effected, yet without the intervention of mesmerism. How often do we see one physician inspire hope and confidence in his patient, when reduced to the lowest ebb of debility, and gradually, by calling out the energies of this great pillar of the soul, raise the patient from great and helpless feebleness to health, strength, and vigour? How often,

even, do we observe in disease, where the evil presess most on the vital energies; where the mind is filled with gloomy images, yet so long as there is no organic change, the patient gradually recovering from the most alarming degrees of debility and apparent bad health, under no other means than the attention of kind friends, the assiduities of a good nurse, some change of scene or any similar new arrangement of external objects.

These changes take place, it is matter of observation, more among females than among the other sex, and among the latter more among those of the nervous temperament and delicate frame, than among the sanguine and the robust. Instances of mesmerie influence, as they may be called, have been long known and are of frequent occurrence, where neither passes, magnetic sleep, nor any other ceremonies and mummeries are practised. Cowper was evidently mesmerised by Mrs Unwin, at one time, and by Lady Hesketh at another; and the mesmerism had marvellously beneficial effects in both cases. Yet neither of these excellent and pious ladies ever used any passes, or put the poet into the magnetic sleep, or practised any other art, except that of unwearied attention, incessant kindness, and that tenderness of handling and humouring all the faculties, feelings, and frailties of the sufferer, which made him feel that his sufferings were understood, his frailties compassionated, his wants anticipated, and his confidence secured.

When we thus allow Mesmerism some influence, we desire not to be misunderstood. That influence, though real, is exceedingly trifling, and it is absolutely nothing in comparison of what it is represented to be by its advocates. Its power even of putting asleep has been grossly overrated; and it is so very insignificant that it is of no practical use. In this respect we have put it to the test of experience. We have offered to those who practise the art of inducing magnetic sleep, to put into a state of quietism or repose, fever patients who have been sleepless for several nights. This they have invariably declined to do. We have requested them to try the experiment on persons labouring under the *agrypnia* of *delirium tremens*, mania, and other diseases of the brain. In all they have declined the attempt; or, when the attempt was made, they have completely failed. Yet, if the art of mesmerism had really the power of inducing sleep, the induction of that blessing in such circumstances was a fact well calculated to establish the powers of the art.

Then what is the magnetic sleep, it may be asked? From what has fallen under our own observation on this matter, we infer that it is a state of the nervous system peculiar to hysterical persons, allied probably to catalepsy or hysterical stupor. This, however, it is not at all necessary to explain. The fact of mag-

netic sleep being induced in certain persons by certain processes operating on the nervous system, we admit, chiefly as a phenomenon in the operations of the imagination and that mixed state which results from the influence of the nervous system on the corporeal organs. It is evidently not natural sleep, neither is it a natural state. But it is a morbid condition of the system as much as catalepsy, trance, or the hysterical syncope, or somnambulism, and is rather an object of pity than of envy.

We have now said all that the case of Miss Martineau, as a medical case, strictly requires us to say; and at present our limits suggest to us that we must conclude. We have not been able at present to enter on another of the questions suggested by the Letters of Miss Martineau, namely, the alleged lucid vision of some of the mesmerised, and especially of the daughter of Miss Martineau's landlady. These pretensions are neither new nor unrivalled. Instances of them are given by Deleuze, Cloquet, and many other writers; and the performances of Mademoiselle Pigeaire, the Okeys, and various other impostors, are every whit as good and perfect specimens of pretension and deception as those detailed in the present treatise. Miss Martineau represents this young woman to have possessed or acquired during the magnetic state, not only most accurate and extensive knowledge of diseases and their treatment, but to have something like a second-sight knowledge of events and transactions proceeding at a great distance from the scenes of her observation. When such claims are made, it may be regarded as certain that a great deal of deception is practised. How, it may be said, does it happen that these persons cannot cure themselves; cannot provide for their own subsistence, except by fraud; and, in short, can do nothing more than other people not clairvoyants. Indeed, the whole of these alleged clairvoyants are hysterical females, in whom the love of deception is extremely strong, and who, being flattered, and humoured, and almost worshipped as a set of inspired beings, give way to the wishes and desires of those around them, and, by making a few happy guesses, lead persons as willing to be deceived as themselves to suppose, that the whole is a new species of knowledge, and exercising a newly-discovered set of faculties. All this would be very well were the knowledge correct, or were it of that kind that it could be applied to useful purposes. This, however, we know it is not. The clairvoyants have been detected in numerous blunders, and will be detected in many more.

This subject, however, we must at present conclude. And while we do so, we hope to have an early opportunity of considering this second question, and showing the shallowness of the pretensions of the whole race of clairvoyants, mesmerisers, somnambulists, and hysterical pretenders.

ART. V.—*Practical Observations on the Principal Diseases affecting the health of the European and Native Soldiers in the North-Western Provinces of India; with a Supplement on Dysentery.* By W. L. MACGREGOR, [M. D., Surgeon First European Light Infantry. Calcutta, 1843. Pp. 294, and Appendix, pp. 118.

Now that the value of pathological researches are appreciated by the medical profession in this country, and that these are every day throwing new light on the nature and of course on the treatment of disease, our brethren in the colonies are venturing to leave the old trodden part of empiricism, and, by prosecuting similar pursuits, are also advancing in the right path. Dr Macgregor informs us in his preface that it was from the prosecution of pathological researches that he was led to adopt a particular course of treatment in these three very fatal diseases of tropical countries—Fever, Cholera, and Dysentery. It was, indeed, with the view of elucidating these views, and pointing out to the profession the success of the practice which they had led him to adopt, that Dr Macgregor was induced to engage in the present work; and, as writing on one disease naturally leads on to another, he has included a short sketch of the chief diseases of India.

Dr Macgregor's work opens with a few general remarks on the prevailing type which fever assumes in tropical countries; the effect of heat in predisposing to affection of one organ in preference to another, in giving rise to increased irritability, congestions or determinations of blood to particular organs, &c.

Bilious remittent fever is the most prevalent, and, with the single exception of cholera, the most fatal disease in India. It was from observing the constancy of the overloaded state of the gall-bladder with thick dark bile in all the fatal cases which he inspected, together with the absence of biliary secretion in the alvine dejections, that Dr Macgregor was led to consider this as one of the causes which most powerfully influenced the nature of the disease, in fact, as its proximate cause. The state of the bile, gall-bladder, and liver in this disease were much more minutely described by Twining; but it is not to the existence of this state that the author lays any claim as to originality, but to the application to practice of means which are specially directed to counteract or correct this peculiar state. Hence, after the full employment of blood-letting, he usually gave an emetic of ipecacuan and tartar emetic, or of this latter alone, and then croton oil in conjunction with opium. It is to this last remedy he attributes the therapeutic property of emptying the gall-bladder of its inspissated contents.

sated dark bile, improving the nature of that secretion, and thus removing "the proximate cause of the disease." The first case in which he made use of this remedy was too far gone to be benefited by the treatment. It, however, brought away during life a copious black stool, which "proved to be the contents of the gall-bladder;" and after death the gall-bladder was found filled, not with dark thick bile, but with fluid and healthy bile. Calomel, jalap, and all other purgatives he found perfectly inefficacious in causing the evacuation of the dark bile from the gall-bladder—croton oil was the only one which succeeded. Though an irritant purgative in the small dose, the author found it to act as a "sedative purgative" when administered in the large one of five drops. In the severe form of bilious remittent fever the author regards this "emptying of the gall-bladder as a point of the first importance; and until this is accomplished, the lancet, calomel, and other remedial means are incapable of checking the disease." The author differs from most other writers on the diseases of India as to the time of administering quinine in this fever. The moment the remedial means induce an intermission in the fever he gives quinine in large doses—10 grs. in a pill, and continues the same medicine in small doses in solution at shorter intervals. He considers it bad practice to wait till the yellow colour of the skin be removed before giving quinine, seeing that each exacerbation endangers the life of the patient, and that calomel is a very inefficient means of removing that state of the system on which the yellowness depends—very inferior to the large doses of croton oil. Powerful as the lancet is in subduing determination to the head, it is often inadmissible, especially when the patient is one who has been a considerable number of years in India. In this case ice applied to the head is one of the most valuable therapeutic agents; and Dr Macgregor states that a full supply of this article at the different stations in the north-west provinces of India would save many a useful life. He points out the importance as well as the pecuniary saving to government, of the establishment of invalid stations on the cool regions of the hills, and the maintenance of a regular establishment of palanquin bearers from the different army stations to these invalid stations. Every European soldier, it appears, costs the government about L.100; and as about 50 cases occur annually at the stations of Kurnaul and Meerut, which are lost in consequence of the want of such a station for recovery, and as the whole annual expense of a regular establishment of bearers from Kurnaul to Landour would only cost about 1500 rupees or L.150, by such an establishment he calculates that government would effect a saving of 48,500 rupees annually.

Cholera, in its stage of collapse, Dr Macgregor agrees with Mr Annealey, is a perfectly manageable disease; "and in my own

experience, (says he,) when cholera raged as an epidemic at Muttra, in April 1838, I found the lancet employed at this stage perfectly capable of arresting the disorder." When it has got to its spasmodic stage, with incessant vomiting and purging, &c. it is then that all remedial means have failed. The author, however, finding that in the fatal cases the gall-bladder was distended with dark ropy bile; that no bilious matter was passed by stool during life; and that the appearance of bile in the stools always indicated a favourable result, regarded this state of the gall-bladder as the proximate cause of the disease, and determined to try the effect of the same mode of treatment he had found so efficacious in the bilious remittent fever. This treatment, under his hands, seems to have had such marked success, so much so, indeed, beyond what has occurred in the hands of any other practitioner, that we make no apology for transcribing the history of a few of the cases, together with his preliminary remarks.

"Having formed the opinion, that the proximate cause of both cholera, remittent fever, and dysentery was intimately connected with the state of the gall-bladder, I had determined on using the same remedies in cholera as I had found capable of emptying the gall-bladder in bilious remittent fever, namely, the most powerful sedative and purgative we possess; the combination, therefore, of opium and croton oil was the form of prescription fixed on; and the persevering use of these powerful medicines satisfied me of the correctness of my views regarding cholera; and its intimate connexion, as far as regards the essential cause, with both fever and dysentery.

"As this treatment, which may be strictly called the sedative, is likely to lead to favourable results in the cure of cholera, the reader will, I am sure, forgive the introduction of the cases illustrative of the practice into the body of this work.

"CASE 1.—I was called about 11 A. M. of Monday the 8th November 1841, to see Mr. D. an overseer in the canal department, who was supposed to be labouring under an attack of cholera. Before starting I got the following pills ready.

R *Opii* (Hill) gr. xii. *Ol. Croton* gtt. xx.
these were formed into eight pills by the addition of crumb of bread; and two of them thus contained three grains of opium, and five drops of croton oil, the usual dose employed in severe bilious remittent fever: I anticipated that a much larger dose would be required in cholera, and the result will show that my calculation was correct.

"On reaching Mr D.'s quarters, I found him lying on his back with an anxious expression of countenance and sunken eyes: the pulse small; vomiting and purging incessant; stools thin and whitish; occasional cramps; coldness of the extremities; and unquenchable thirst.

"He took two of the pills immediately, but rejected one of them,

its place was supplied by another ; and his head was laid as low as possible. The nausea and vomiting quickly subsided, and he expressed himself as quite easy, saying, that he was now sure that he had cholera !

" At 2 P. M. I left him with directions, that if the vomiting and purging returned, two more of the pills were to be administered.

" It appears that Mr. D. wished for some brandy and water, which I had told him he might have ; but on his taking a little the vomiting returned ; and two more of the pills were given ; or, five in all, one having been rejected ; he had thus retained six grains of opium, and ten drops of croton oil.

" 9th November. The patient had passed a tolerable night ; and had two alvine evacuations ; he was ordered half an ounce of Castor oil, and the same quantity of peppermint water, which produced two scanty stools. In the course of the day, the tongue being dry, he took infusion of senna and chirayita ; of each an ounce and a half with half an ounce of Epsom salts ; this draught did not operate freely, and at 10 A. M. he took the following :

R. *Ext. Coloc. gr. x. Pulv. Jalapæ ℥j. Pil. Hydrarg. gr. x. Syrup. Simpl. ℥ij. M.*

" The bowels were now freely moved, and Mr D. was quite recovered by the evening.

" Case 2.—At 1 P. M. of Wednesday the 10th November 1841, I was requested to visit Ensign F. who was described as suffering intensely from vomiting and purging.

" On reaching his house, he appeared a good deal alarmed, and complained of great nausea and vomiting : the stools had not been very frequent ; but he complained of a burning sensation about the scrob cordis, and in the abdomen : he had severe griping ; tongue dry and thirst urgent. He took immediately, 3 grains of opium and 5 drops of croton oil.

" The urgent symptoms speedily abated ; but as quickly re-appeared ; and after an interval of half an hour, he took another pill, which had little effect, and in half an hour afterwards he had the following :

R. *Opii gr. vi. Ol. Croton gtt. v. in the form of two pills ; after this, he rapidly recovered.*

" Case 3.—On Monday the 6th December 1841, I was sent for to visit Mr H.

" I found him in great agony, his moans and cries being heard at a great distance from his quarters. The stomach was irritable and there were constant and ineffectual attempts at vomiting ; the alvine evacuations were thin, white, and frequent ; he had pains and cramps in his bowels ; also about the back and neck. He took immediately *Ol. Croton gtt. v. Opii gr. iij. in the form of pills.*

" As the pains continued and the purging increased, the pills were repeated much against the patient's will, for he knew their composition ; the second dose was given ten minutes after the first ; and

some relief followed ; but still the pains did not subside ; and he took two more pills.

" Thus, in the space of twenty minutes, Mr H. took nine grains of opium (Hill) and fifteen drops of croton oil ; he soon after fell asleep, and slept soundly throughout the night. The bowels were freely moved next day, and since that period he has enjoyed excellent good health.

" CASE 4.—I was sent for at 1½ P. M. on Monday the 6th June 1842, to see Mrs C. who had been admitted into the Artillery hospital with cholera. The following is copied from the hospital diary, and will give the particulars of the case.

" June 6th, 2 P. M. Admitted with spasmodic cholera about half an hour ago: the symptoms were vomiting and purging, the latter of congee-water like fluid ; pulse scarcely to be felt at the wrist. Tongue cold, also the expired air ; hands affected with cramps ; thirst urgent ; no headach. Has taken *Opil. gr. iij.* ; *Ol. Croton* gtt. v. twice since admission, and the stools now voided are copious and feculent.

" 2-30 P. M. The pulse is felt at the wrist ; but the tongue is still cold ; is drowsy, and feels easy ; no return of vomiting ; nor has she voided another stool ; the medicines to be repeated.

" 3 P. M. She has vomited freely a quantity of bile.

" 7 P. M. The pulse is now soft and regular ; tongue warm ; has some thirst ; no nausea ; has not yet slept.

" June 7th. Has not slept ; pulse soft and regular ; skin moist ; tongue warm ; bowels not yet moved ; slight thirst ; no local pain.

" R. *Ol. Ricini Aq. Menthae aa ʒij. M. ft. Haustus statim sumendus.*

" P. M. Has been moved five or six times ; has some uneasiness at the *scrob. cordis* ; has slept a little.

" 8th. Discharged from hospital."—Pp. 67-70.

" Case 5.—I was sent for about noon on Saturday the 11th June 1842, to see a native Christian woman, admitted into the Artillery Hospital with symptoms of cholera.

" On reaching the hospital, I found her with a small scarcely perceptible pulse : skin cold ; features shrunk ; particularly the eyes, which had a brown areola round each ; tongue cold, also the expired air ; pain at the *scrob. cordis* ; the vomiting and purging, which had throughout the previous night been incessant, had ceased since the administration of the anti-cholera pills by the apothecary ; the stools described as light-coloured. She took two more of the pills as free vomiting had not occurred.

" At the evening visit I found that she had vomited bile, and her tongue was dry ; the pain at the *scrob. cordis* had not entirely subsided ; and a blister was applied. From this period the old woman became convalescent ; and being a weakly old creature, she remained for some days in hospital in order to regain her strength.

"Case 6.—Corporal Lewis, 1st Company 2d Battalion Artillery was seized with symptoms of cholera about 1 P. M. of Tuesday the 19th June 1842, at Kurnaul.

"The apothecary had given him calomel and opium on his admission; but the medicines rather increased than lessened the uneasy symptoms, particularly the burning sensation in the epigastria region. At 7 P. M. I saw him for the first time, and gave him the anti-cholera pills of the usual strength. At 10 P. M. he had vomited freely, and felt very easy about the stomach: thirst less, the bowels had also been moved, but in a different manner from what they had been before taking the pills; the tongue was warm; and there had been no return of the cramps in the fingers, which had been present when first attacked.

"This man was discharged on the 21st June."—P.71-72.

The author had only as yet had an opportunity of trying the effect of this mode of treatment in four other cases, which also recovered. Three of them are given in the appendix.

Whatever we may conceive of the author's pathology or etiology, it is gratifying to learn that the practice which he adopted proved so very successful. Of all the numerous theories which have been proposed relative to the etiology of this disease, none have carried with them even the appearance of probability; and the consequence has been, that when the disease once fairly formed, it mattered not what course of treatment was pursued; for, in the epidemic cholera which ravaged Europe in 1832, the very same number of cases died, (viz. one-half of those seized,) whether the cases were subjected to treatment or not. The pathological condition of the liver, gall-bladder, and bile, considered as the proximate cause of cholera-morbus by Dr Macgregor, though possibly themselves dependent for their diseased condition on the vitiated state of the vital fluid, seem as likely as any other organs to keep up or induce the continuance of diseased actions which constitute the essential symptoms of this disease. That the blood is the part of the system primarily affected in cholera seems to be satisfactorily proved, not only from the recorded observations of all writers on the state of this fluid in that disease, but more especially from the effect of blood-letting in the stage of collapse, before the spasmodic symptoms have made their appearance. We not only learn from Annesley, Macgregor, and other writers on the cholera in India, but from many of the writers on the epidemic cholera in Europe, that blood-letting, when employed early in that stage, cuts short the disease; and we have many times witnessed its marked effect in thus preventing the subsequent formation of the spasmodic symptoms during the prevalence of the epidemic cholera in 1832. If the blood, then, be regarded as the fluid whose condition is first altered by the epidemic poison, and its deranged condition first and most essentially disorders the bi-

liary functions, whose healthy condition is most essential to life, they would react on the vital fluid, and maintain or still further increase its diseased state. In a disease, however, so obscure in its etiology and pathology, the test of practice ought not to be lightly regarded as proof of the truth of both of these; and as Dr Macgregor's practice has been eminently successful in his own hands, we shall look with no small eagerness to news from our Indian brethren for a confirmation of its success in their hands. Meanwhile we may congratulate the author that he has been so successful as to discover a remedy which promises to accomplish what has eluded the grasp of the whole medical faculty of Europe and America.

In India, cholera often assumes a truly endemic character, and this is so frequently noticed, that the author thinks in every case the camp ought instantly to be moved to new ground as soon as that disease makes its appearance. He states, that when this is done, it frequently happens that not a single new case will occur among the troops. For the author's further remarks on this disease, we must refer to the work itself.

The author's views on the nature of dysentery accord more with the now exploded notions of the Anglo-Indian practitioners of the last century than those of the present day. They held that dysentery depended on disordered functions of the liver, and Dr Macgregor, from finding that the liver is occasionally diseased, and that the gall-bladder is loaded with thick dark bile, attributes dysentery to the same cause. He offers, however, a somewhat different *modus operandi* of this assumed cause. The viscid bile is not discharged into the intestines, the consequence of which is, that "the absence of the bile from the bowels renders their contents irritating," and "constitutes the essential cause of dysentery." The writings of Marshall, Annesley, Sir George Ballingall, Twining, and many others, render it abundantly evident that dysentery is essentially an inflammatory affection, characterised by all the symptoms of inflammatory action during life, and by redness, ulceration, and even sphacelation of the bowels, seen on inspection after death. Dr Macgregor is evidently staggered by the fact of the mass of disease seen in the bowels in the fatal cases, and feeling the impossibility of accounting for its presence, on the supposition of irritation being the alone cause of dysentery, allows that, if the irritation be not removed, it terminates in inflammation and ulceration.

We fear the cause which the author assigns for dysentery is not a very sufficient one, or one which will satisfy most minds. The bile, far from being commonly regarded as of a soothing or anodyne nature, has been very generally considered as a natural irritant and stimulus to the bowels, so, much so, indeed, that dried

ox gall has been used pretty extensively of late years as a sure cathartic. We do not find, however, that the author's views lead to any improvement in the modes of treatment which sound views of pathology had previously suggested. Blood-letting, calomel, or ipecacuan and opium in acute cases, are what he seems to consider preferable in every case, and especially in chronic cases, large doses of opium alone, with injections of nitrate of silver, where ulcerations of the bowels are present, and occasional blisters, or local detraction of blood over the site of the colon, are the remedies chiefly recommended. He enjoins, as essential to recovery, strict abstinence from all irritant medicines or articles of diet, from wines or alcoholic liquors, or from anything which could irritate the already too irritable bowels. When the dejections have become natural, and all griping pain and tenesmus are gone, infusion of chirayita with aromatic sulphuric acid may be given. It is mentioned that where opium was chiefly trusted to, dropsical symptoms were induced, which speedily cut off the patients. This may be a salutary warning not to trust the cure of an inflammatory complaint to sedatives without vigorous depletion.

In detailing the morbid appearances met with in dysentery, the author describes one relative to which it were desirable he had given more minute details. He calls it the "fungoid or lichenous excrescence of the colon." It is thus described.

"In chronic dysentery, when that disease has been subdued by opium or other remedies, a process is set up in the colon of a most extraordinary nature, whereby the ulcers are obliterated throughout the whole extent of the gut, at least as far as the rectum, the structure of which does not appear capable of undergoing such a change.

"In the patient alluded to at the close of the last chapter, the appearance, on laying open the colon, was that of fragments of hardened feces adhering firmly to the mucous or villous coat of the colon.

"In the transverse arch and descending portion of the gut, these fragments were continuous, forming a series of prominent fungous, or lichen-like tumours. On attempting to remove one of them, it was found to be a distinct formation of a new substance, presenting the appearance of a vegetable fungus; and on cutting through it, was found resting on an ulcerated or sphacelated base, thus supplying the place of the mucous and muscular coats! In the sigmoid flexure the fungi were distinct, and at some distance from each other. The process appeared to have subsided in the transverse and descending colon; and probably, in the sigmoid flexure, where the ulceration existed in a less severe form.

"This case illustrates the fact, that ulceration of even the whole surface of the mucous coat of the colon is capable of undergoing a sanative process."—P. 89.

"The fungi exhibited in this case, as well as in that of private Tetness of H. M.'s Buffs, (Appendix No. 52,) disclose the process which nature pursues in the cure of Chronic Dysentery; and it is fair to conclude, that when men recover from this disease after months of well-marked ulceration, this process has taken place, and that these fungi do exist in living men."—P. 90.

From the description above given, it may be inferred that the appearance described was hypertrophy of the mucous follicles, which became the seat of ulceration from the deposition of lymph in and around them, possibly, in fact, such a further stage of those "growths of granulations" described by Twining as being occasionally met with in cases where ulceration existed in the colon. We cannot believe they have any analogy with vegetable productions, though it is an undoubted fact that vegetable growths make their appearance on many parts of the structures of even living animals in a weak or dying state; and would be still more likely to attack sphacelated spots in such persons in tropical countries. We have not, however, the means of determining this point from the description given.

The remaining diseases treated by Dr Macgregor are, Intermittent Fever, Colitis, Hepatitis, Functional Diseases of the Liver, Constipation, Phrenitis, Delirium Tremens, Hæmorrhoids, Scurvy, Dry Gangrene, Dropsy, Obesitas, Rheumatism, Variola, Rubeola, and Ebrietas.

In the treatment of many of these, the author commends the croton oil in five or six drop doses, with an equal proportion of henbane or of opium, as a most invaluable therapeutic agent. Even in habitual constipation he prefers administering this dose at the interval of a week or month, for to such a length of time its beneficial effects last, to administering daily some kind of pill or potion. In alvine obstructions he considers it preferable to all other remedies, and he does not fear to continue it day after day, till the bowels regain their tone, and properly perform their functions.

The most successful treatment of delirium tremens was found to be the exhibition of one grain of tartar-emetic with one drachm of laudanum in half-an ounce of camphor mixture every hour till sleep was induced. In one case two ounces and three drachms of laudanum were taken before sleep was induced, and with the most beneficial results.

Under the head of scurvy Dr Macgregor describes that disease as it occurred among the native Hindoo and European soldiers in the north-western provinces of India. In the European soldier the cause could not be attributed to the want of animal food, or of fruits and vegetables, nor yet to confinement to a salt diet. The Hindoos who were attacked lived on a poor farinaceous diet, drinking nothing but water; and it appeared among them when

called to perform any arduous service. Dr Macgregor, therefore, attributes the disease in both to residence in low ill-ventilated buildings, to damp situations, to depressing affections of the mind, to debility produced by fever, rheumatism, or the abuse of mercury, but above all, to the constantly breathing vitiated air. Change of air was always its most effectual remedy.

In small-pox Dr Macgregor derived great benefit from the administration of opiates in such large doses as to allay all irritation and induce sleep. To keep the skin moist he gave acetate of ammonia, and regulated the bowels by laxatives and enemata. The administration of opiates at bed-time has long been practised in this country; but we are not aware that they have ever been given in such large doses or with such marked relief as appears to have followed their use in Dr Macgregor's hands.

The last chapter contains some judicious "remarks on the use of opium and croton oil, as contrasted with that of calomel in the cure of fever, cholera, and dysentery." The author points out the injury which the injudicious and indiscriminate use of calomel has on the constitution, especially when administered in those large doses which it is still too much the custom to employ over all India. He demonstrates that there are few purposes for which this baneful medicine is given which cannot be better answered by that of croton oil and opium, or either singly. That calomel is a valuable purgative and sedative, he does not deny, and where used judiciously does no harm. It is the abuse of it—i. e. the mode in which it is used in India, which Dr Macgregor finds fault with, and which ruins as many constitutions as it cures. In noticing the effects of opium he mentions the fact of the different effects produced by the Hill opium, and the black, nauseous clammy opium of the central parts of India. The Hill opium in general character more nearly resembles Turkey opium, but contains only 3 per cent. of pure morphia. It does not, however, induce that violent headach which the black opium of the plains is so apt to cause. As to any theoretical objections which might be urged against the use of croton oil in repeated doses, Dr Macgregor mentions, that "one peculiar advantage enjoyed by this oil is, that its long-continued use is not followed by the excessive debility attendant on many drastic purgatives, particularly saline ones," and that it "appears to have the power of breaking down the matter forming alvine obstructions, and expelling the scybalæ which form in the intestines of costive people."

In the Appendix—printed one year after the body of the work—the author states, that, out of three hundred cases of bilious remittent fever treated according to the plan he recommends, he has only lost one! This of itself speaks strongly for the practice, and, should it prove equally successful in the hands of others, it will be one of the greatest improvements in practice which have appeared

of late years. From the appendix we learn, that the author's practice in the treatment of cholera by croton oil and opium has been, as yet, so successful that he has not lost any of his cases by that fatal disease. If this does not prove that the author's views of the proximate causes of both bilious remittent fevers and cholera are correct, it at least proves that the author's views are nearer the truth than any which have yet appeared.

In the appendix the author modifies the views of dysentery which he held in the body of the work. Instead of viewing dysentery as one species of disease, he holds that there are seven distinct species, each requiring different treatment. These he names,—1. Idiopathic Oriental Dysentery; 2. Common Dysentery; 3. Bilious Dysentery; 4. Hæmorrhagic Dysentery; 5. Hepatic Dysentery; 6. Hæmorrhoidal Dysentery; and 7. Mercurial Dysentery. It is to the first three that the treatment he recommends is especially applicable; but for details we refer to the work itself.

ART. VI.—*A Bill for Regulating the Profession of Physic and Surgery.* (Prepared and brought in by Sir JAMES GRAHAM and Mr MANNERS SUTTON.) Ordered by the House of Commons to be printed, 25th February 1845.

THIS is a second edition, as it may be called, of the Bill introduced on the 7th of August 1844, and it presents several changes, to which, though not affecting the general character of the measure, it may be proper shortly to advert.

1. The power of prosecuting persons practising medicine without any legal qualification, though left, as regards the Colleges, in the same state as in the measure proposed last session, is permitted to the society or Company of apothecaries.

2*d.* In Scotland there is to be only one board for examining and granting licenses to surgeons, and that board is to be the College of Surgeons in Scotland. In the former bill it was proposed that a similar power should be granted to the Faculty of Physicians and Surgeons in Glasgow.

3. As the Faculty of Physicians and Surgeons in Glasgow are left out of the bill, assessors to the Faculty of Medicine in the University of Glasgow will be taken from the Colleges of Physicians and Surgeons in Scotland. These may be resident in Edinburgh or Glasgow.

4. Provision is made for holding special examinations, and granting special licenses in midwifery.

As we infer that this is not to supersede examination in midwifery by the boards for examining and licensing general practitioners, we understand that these special licenses are chiefly to be

given to those who devote themselves either exclusively or very much to midwifery practice, as physician-accoucheurs or surgeon-accoucheurs.

5. It is proposed that examiners for licentiates shall be chosen, not from the Apothecaries' Company *qua* Apothecaries' Company, but from the body of licentiates in medicine and surgery registered for not less than ten years, or until there be persons so qualified, from those of the body of Apothecaries who have been in actual practice for not less than *ten* years.

The 22d clause contains a restriction on the power of granting medical degrees, in consequence of which it shall not be lawful for any university in the United Kingdom, to confer any degree in the Faculty of Medicine, except by special license of the Council of Health, upon any person, unless he shall have been matriculated in the same university, and shall have duly attended the courses of public lectures prescribed by the same university to students in medicine at the seat of the same university; or, in the case of the University of London, at some Medical School recognised by or in connection with that university, during at least *two* years after he shall have been matriculated in the same university, and shall have been examined at the same, before the granting of such degree, by the proper examiners of that university, and found by them to possess competent skill and knowledge in medicine and the collateral sciences.

The effect of this provision will be, that some universities, as St Andrews, in which there is no complete medical school, will be incapable of granting degrees without a special license obtained from the Council of Health.

As, however, this would operate against the Universities of Oxford and Cambridge, a specific clause is introduced, saving their privileges, and allowing them to confer degrees in medicine as heretofore, without applying for the license of the General Council. (39.)

7. Some useful and beneficial changes are made in the mode of exacting the fees for matriculation, (25,) and in the rate of those for registration. (32.)

8. It is provided that persons guilty of felony or fraud, that is, we infer, convicted of felony or fraud, shall have their names removed from the register. (36.)

These changes are, on the whole, improvements. The one first specified may be viewed as a concession to the apothecaries and general practitioners. Any hurtful consequences are entirely removed by the 31st clause, which prevents the Company of Apothecaries from prosecuting those licensed under the act.

We have only to express the hope that the bill will be speedily passed into law; and that in so doing, it will preserve all its essential characters.

PART III.

MEDICAL INTELLIGENCE.

PHYSIOLOGY.

Experiments on the Mass of Blood relative to the Weight of the Body. By M. WANNER. (*Gazette Medicale de Paris*, November 19, 1844.)—As it was impossible to ascertain in man the important fact of the weight of the blood to that of the body, M. Wanner made several experiments on the lower animals. The animals were first carefully weighed, and then bled to death by the butchers and the blood weighed.

A bullock, weighing 1650 lbs. Imperial, yielded 69 lbs. of blood. The proportion was therefore as 1 to 23·81, or rather more than 4 per cent. of blood.

Another bullock, weighing 1640 lbs., yielded 65 lbs. of blood. The proportion was therefore almost the same as the first, 1 in 23·73.

A cow, weighing 1293 Imperial lbs., yielded 59 lbs. of blood. The proportion was therefore 1 in 21·77, or nearly 5 per cent. of blood.

A sheep, weighing 110 lbs., yielded 5½ lbs. of blood, or in the proportion of 1 to 22·72, or about 4½ per cent. of blood.

Another sheep, weighing 88 lbs., yielded 4·4 lbs. of blood, or in the proportion of 1 in 20, just 5 per cent. of blood.

In a rabbit the proportion of blood was as 1 to 25 exactly.

As it may be safely inferred that man follows the same laws in this respect as the lower animals, it may be deduced that a person weighing 100 lbs. has 5 lbs. of blood in his body,—a person weighing 200 lbs. nearly 10 lbs. of blood, and so on. The practical conclusion which the author deduces from this fact is, that a blood-letting to the extent of two cups from a woman weighing 100 lbs. is as much as one of four cups from a man weighing 200 lbs. The blood-letting ought, therefore, in every case to be proportioned to the weight of the individual. Thus, if 2 lbs. of blood were drawn from an individual 100 lbs. in weight, it would abstract nearly one-half of the blood from the body. Nine leeches, each abstracting half an ounce, would draw half of the blood from a child 5 years of age, whose average weight is about 30 lbs., and as 4 or 5 ounces is all the available blood in a child at birth, this fact should make us cautious in allowing blood to escape from the chord in cases of apoplexy, &c.

It is remarked by M. Guerin that these experiments merely relate to the available blood in the body, and though true in a physiological and practical, are not so in a pathological sense.

Experiments on the Blood. By M. DUPUY. (*Bulletin de l'Academie Royale de Medecine*, 24th September 1844.)—The following experiments show how very rapidly the blood alters in its qualities, and M. Dupuy

thinks they tend to throw light on the development of malignant carbuncle, plague, &c.

A few ounces of arterial blood were drawn from the carotid artery of a horse, and found to contain twenty-one grains of moist fibrin per ounce. The pneumogastric nerves were then included in a ligature, and in a few minutes afterwards a few more ounces of blood were drawn from the same artery. It was found to have assumed a black colour, like venous blood, and to contain much less fibrin.

The same experiment was performed on another horse, with this difference, that the ligature was only so far tightened as to compress the nerve without destroying its texture. The arterial blood was black like venous blood, a few seconds after the nerve was compressed; but almost immediately assumed its bright arterial hue when the ligature was relaxed. This curious experiment was frequently repeated on the same animal in the presence of MM. Thouret, Hallé, and Dupuytren.

Another horse, one ounce of whose arterial blood yielded twenty-one grains of moist fibrin, had tracheotomy performed, and then the pneumogastric nerves cut across. On the sixth day thereafter, an ounce of its arterial blood yielded only seven grains of moist fibrin. It died on that day. The cut ends of the nerves were found on the third day to be inflamed and swollen, and to exhale a very fetid odour. On the fourth and fifth days the respiration was difficult, and the animal presented the same morbid phenomena as those which attend carbuncle or malignant pustule. A portion of the spleen of this animal was placed as a seton under the skin of a vigorous horse. Painful oedematous swelling soon manifested itself, and rapidly extended; great difficulty of respiration came on, and the animal died on the fifth day with symptoms of asphyxia. The nerves of the eighth pair were found ecchymosed and altered in structure, and the whole symptoms presented a striking analogy with those described by Chaussier as characterising the malignant pustule.

During a series of experiments on injecting various fluids into the veins, it was found that a solution of the healthy cerebral matter of a cow or sheep, suspended in water and injected into the veins of a horse, killed it as instantaneously as a solution of corrosive sublimate, and the morbid appearances were the same.

On the Modification which the Blood undergoes during Inflammation By MM. ROBERT-LATOUR and COLLIGNON. (*Comptes Rendus de Séances de l'Académie des Sciences*, 28th October 1844.)—The experiments of MM. Latour and Collignon were for the purpose of ascertaining the connection between the presence of fibrin in the blood and acute inflammation; and the investigations included the examination of arterial as well as of venous blood. These experimentalists drew, at the same moment, from a large dog, a quantity of arterial and of venous blood. The proportion of dry fibrin which the arterial blood furnished was found to be 0.20 per cent., while that of the venous blood was 0.25 per cent. Pleuro-pneumonic inflammation was then excited by the injection of a quantity of alcohol into the pleura; and, four days after, when the fever was high and the pulsation 190 in the minute, a second quantity of arterial and venous blood was again drawn. The arterial blood was now found to yield 0.40 per cent. of dry fibrin, and the venous 0.50 per cent.

A similar experiment was made on another dog with the same result, from which the authors conclude,

1st, That arterial, like venous blood, presents a notable increase of fibrin as soon as inflammatory action is set up.

2d, That the changes which the blood undergoes are the consequence, and not the cause of disease.

PATHOLOGY.

Experimental Researches on the Action of Oils on the Animal Economy. By MM. GLUGE and THIERNESSE.—(*Gazette Medicale de Paris*, 9th November 1844.)—Olive oil and cod-liver oil were the two fatty oils used by MM. Gluge and Thiernesse in their experiments, and they were administered to dogs, rabbits, and kids, by injection into the veins, and also by the mouth. When either oil was injected into the veins, it usually produced dyspnoea, debility, painful sensation, and some affection of the circulation. The animals, after a few days, usually recovered from the first injection, but died very shortly after repeating the operation, from difficulty of breathing, rapidly failing pulse, and complete prostration. On dissection the lungs, liver, and kidneys were usually found in a more or less morbid state, exhibiting symptoms of inflammatory action; globules of oil, and a peculiar kind of crystals were also very commonly noted in their structures. The blood was more or less fluid, and peculiar crystals frequently remarked. When pure cod-liver oil was used, its action did not seem to differ from that of olive oil; but the brown or dark-coloured cod-liver oil produced rapid death, often within an hour after its injection. In these cases the lungs were gorged with black blood, and emphysematous; and the blood, besides being fluid, contained a much larger proportion of oily globules, and of the peculiar crystals above alluded to.

When the oil was given by the mouth the dose was daily increased from a table spoonful. For several days or weeks the animal maintained its health, but at length it began to refuse nourishment, got feverish, suffered from dyspnoea, agitation of the limbs, weakness, and gradually sunk. In every case the lungs were found inflamed, congested, often hepatized, and everywhere penetrated with oil. The liver and kidneys were also in general more or less engorged with blood.

From these experiments the authors deduce the following conclusions:

1. That olive oil and pure fish oil do not act differently on the animal economy, whether taken by the mouth or injected into the veins, excepting in a few exceptional cases in dogs, when the fibrin of the blood and the muscles seem to acquire additional density when cod-liver oil was taken internally. But this result was not constant.

2. That unclarified dark-coloured fish oil, when injected into the veins, produces rapid asphyxia and decomposition of the blood, as evidenced by the irregular form of the blood-globules, and the presence of crystals in that fluid.

3. That the fatty oils, however introduced into the body, have a natural tendency to deposit themselves in the lungs, liver, and kidney.

4. That in these organs they are deposited in two different ways; they exude into the parenchyma through the capillary blood-vessels, or they become deposited in the biliary cells, the pulmonary vesicles, or the uriniferous canals.

5. That if a small quantity of oil be injected at once, the animal may recover from the effects.

6. That the effects of oil administered by the mouth varies much according to the dose, and the period of time when the animal takes it.

7. That when the dose is daily increased, the animals lose their appetite, become lean, cough, suffer from dyspnoea, and at last present all the signs of a violent pneumonia, to which they fall victims.

8. That the pathological appearances consist of total or partial hepatization of the lungs, with accumulation of fatty matters in the parenchyma of the lungs, liver, and kidneys.

9. That the hepatization of the lungs is always, as to its extent, in proportion to the quantity of oil introduced into the system by the stomach.

10. That the oil administered by the mouth is absorbed by the intesti-

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nal villi, and being thrown by the circulation on the lungs, liver, and kidneys, produces fatty degeneration of these organs.

11. That the particular form of pneumonia, caused by large doses of oil, had been described by the older physicians, under the name of bilious pneumonia, but had not been recognised by the moderns.

12. That when oil is given medicinally for any length of time, we ought to exercise the muscles as well as the lungs, and watch carefully its action, for although cod-liver oil may be a therapeutic agent of much power, it is also one whose use is not unattended with danger, as commonly administered.

Inflammation of the Semilunar Valves of the Pulmonary Artery. By Dr DLAUHY of Vienna. (*Archives Generales de Medecine*, July 1844.)—A girl of eighteen was brought in a dying state to the great hospital of Vienna. It was ascertained that from her earliest infancy she had a very feeble constitution, was thrown into a state of extreme weakness on the smallest exertion, which indeed often brought on fainting. When in that state her face became swollen and her lips livid. More lately she had been subject to palpitations, which were more especially excited on ascending a stair, and often terminated in syncope.

Several ounces of a dark but transparent serum were found in the pericardium. The heart was double its usual size, and a considerable quantity of fat covered its right margin, and the transverse auriculo-ventricular groove. The *venæ cavæ* and the right auricle were dilated and hypertrophied to an extraordinary degree. The ventricles of the heart, but especially the right one, were much hypertrophied. The tricuspid and bicuspid valves were converted on their free edge into a cartilaginous substance, covered with numerous vegetations. The semilunar valves of the pulmonary artery bore deep traces of distinct inflammation. They were thickened, rigid, cartilaginous, and of a yellowish-gray colour.

Case of Necrosis and Expulsion of the Os Hyoides. By M. ROZAT of Bordeaux. (*Bulletin de l'Academie Royale de Medecine*, 1st October 1844.)—Miss B., 41 years of age, deformed from rickets, was subjected to medical treatment for a swelling on the upper part of the neck below the jaw. She was not much benefited, and the tumour remained for a period of about five years. At length she began to be troubled with cough, and expectorated much tough frothy mucus, which was often streaked with blood. After a while portions of false membrane were also ejected, she lost her voice, and the respiration became difficult; she suffered from hectic fever, &c. One day in a fit of coughing she felt a hard body in the throat, which excited vomiting also, when a bone was expelled; after which her cough and difficulty of breathing abated, her voice returned in a few days, and she every day regained health and strength. On examination the bone was found to be the hyoid bone, quite carious on its internal surface, but smooth on its external surface. The anterior and upper part of the neck instead of projecting as usual, appears unnaturally flat and broad; but she has completely recovered the power of swallowing, which was difficult for a considerable time before the expulsion of the *os hyoides*.

Sojourn of a Cherry stone nine months in the Air Passages. By M. MASSEURAT-LAGEMARD. (*Gazette Medicale de Paris*, 16th November 1844.)—A woman, 54 years of age, without cause known to herself, was seized with fits of coughing, which came on every eight or nine days and continued for several minutes. She had no feverish symptoms, nor pain of chest, nor unusual respiratory murmur. As the cough was always attended with sensation of suffocation, she asked medical advice; but as no cause could be detected to account for the cough, it was deemed nervous,

and treated accordingly, but without affording any relief. Nine months after its first appearance, during a fit of coughing, she expectorated a hard body, which on examination proved to be a cherry-stone surrounded with a calcareous incrustation.

Comparison between the new Vaccine Matter and that of 1836. By M. FIARD. (*Comptes Rendus des Seances de l'Academie des Sciences*, 14th October 1844.)—M. Fiard communicated to the Academy of Sciences the results of experiments made with the view of ascertaining whether any difference existed between the development, progress, and duration of the new vaccine matter of 1844 and that procured from the cow in 1836. From the 22d of May last the new vaccine lymph had been used in the Bureau of the third Arrondissement, and had vaccinated 361 cases. It appeared to be more active than the old lymph, and to possess a greater facility of transmission through the human subject.

M. Fiard concludes, from his experiments, that the greater or lesser development of the vaccine vesicles on the eighth or ninth day ought not to be regarded as the test of the degeneration of the vaccine lymph. On the other hand, he regards the continuance and regularity of the eruption, and especially the period of its duration, the most certain sign of the activity of the lymph. When the lymph of 1836 was inserted into the same arm of a child as the new lymph, the progress of both to the eighth day was identical; no difference in any respect could be detected. On the ninth day, however, desiccation commenced in the vesicle produced by the lymph of 1836, and was complete on the thirteenth or fourteenth day; whereas the desiccation of the new lymph vesicle was not complete till the sixteenth or seventeenth day. M. Fiard assumes that the vesicle produced by the lymph introduced in 1800 by Jenner desiccates on the twelfth day, and therefore considers this a proof of its inferiority to the new lymph.

SURGICAL PATHOLOGY.

Mortality attending the Operations of Tying the Large Arteries. By Mr T. INMAN of Liverpool. (*Lancet*, October 1844.) Mr Inman gives the following table, drawn up from a careful examination of all the medical periodicals for a long series of years.

Artery subjected to ligature.	No. of Cases.	Deaths.	Proportion.
Cases collected by Phillips from the works of Boyer, Lancisi, Scarpa, Pelletan, &c. where old operation was performed, viz.			
Femoral tied, -	22	6	1 in 3½
Humeral tied, -	7	1	1 in 7
Hunterian operation,			
Arteria innominata, -	6	6	all died
Subclavian, - -	40	18	1 in 2
Carotid, - - -	40	11	1 in 4
Abdominal aorta, -	3	3	all died
Common iliac, -	8	3	1 in 2½
Internal iliac, - -	4	2	1 in 2
External iliac, - -	27	9	1 in 3
Femoral, - - -	42	7	1 in 6

Mr Inman also gives the following table of the mortality attending the operation of hernia:—

a hand's breadth from the cicatrix. It daily increased till it attained the size of the palm, when the feverish symptoms, &c. induced her to apply for medical assistance. When raising herself, on the 18th July, a slight cracking noise was heard, and the abdominal parietes gave way, as well as the uterus itself, allowing the fœtus, still surrounded with its envelopes, to project through the rupture. Before assistance could be procured the infant was dead; a midwife cut through the chord, and got the woman put to bed. Dr Schröder, who arrived about an hour after this, separated the placenta, and removed some clots from the uterus. He could not ascertain the direction of the rupture through the walls of the uterus, but that through the abdominal parietes was transverse, and crossed the line of the Cesarean cicatrix. The edges of this wound were swollen, soft, œdematous, and unequal, and as they seemed as if unable to bear stitches, adhesive straps were used to bring the edges in contact. The fever of reaction which followed was slight; a considerable quantity, however, of bloody sanies flowed out each time the wound was dressed. Acute pain was shortly after complained of at each extremity of the wound, which assumed a gangrenous appearance, and discharged a very fetid sanies. Under quinine the state of the wound gradually improved; but she was again thrown back by a rheumatic affection, and then by the formation of an abscess in the left inguinal region, accompanied with œdema and partial paralysis of the corresponding limb. Under tonics and generous diet the wound slowly healed, though the old ulceration of the surface continued to be the seat of painful sensations. By the 5th of October the cicatrization of the wound was complete; she suffered no pain; had recovered her usual appearance; her menses had reappeared; and she was able to resume her household duties. The transverse cicatrix was situated four inches below the umbilicus, and measured four inches one line in length. It was very uneven and presented many unequal dilatations. The parietes over it and the seat of the old ulcer were very soft and thin.

MISCELLANEOUS.

Harveian Society.—Notice to Students of Medicine.—The Harveian Society of Edinburgh have fixed on the following subject for their Prize Essay for the year 1846, viz :—

“An Experimental Inquiry, with the view of ascertaining the respective Actions of the Veins and Lymphatics in the process of Absorption.”

Dissertations on this subject must be transmitted to one of the Secretaries, on or before the 1st day of January 1846. Each dissertation must be accompanied by a sealed letter, containing the name and address of the author, and inscribed on the back with a motto. The same motto must also be prefixed to the dissertation to which the letter belongs. None of the sealed letters are ever opened, except that bearing the same motto with the successful essay.

The prize given by the society to the successful candidate is an elegant silver medal, with a suitable inscription.

The candidate is at liberty to employ his essay afterwards, in any way he may think proper: And, accordingly, some dissertations submitted to the Harveian Society have, in consequence of publication, conferred no small degree of reputation on the authors.

No candidate, who has already gained the society's prize, is allowed to compete a second time.

By order of the Society,

RICHARD HUIE, M. D., 8 George Square, }

P. D. HANDYSIDE, M. D., 43 York Place, }

Secretaries.

Edinburgh, March 8, 1845.

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No. CLXIV. will be published on the 1st of July.

M^r FRICHSEN'S paper.

Fig. 2

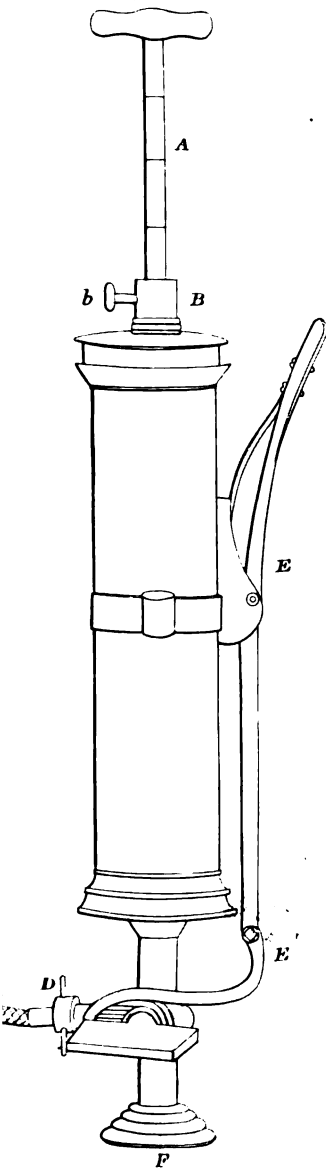
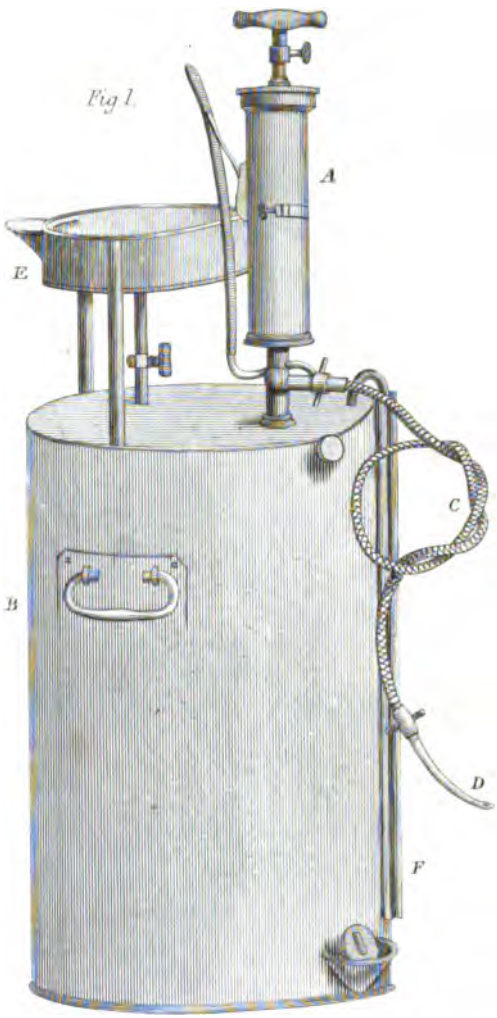
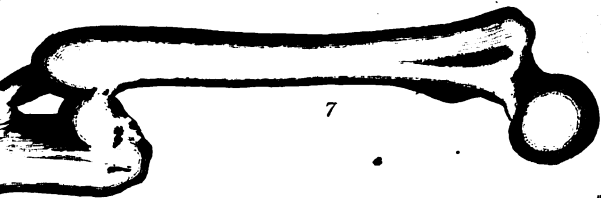
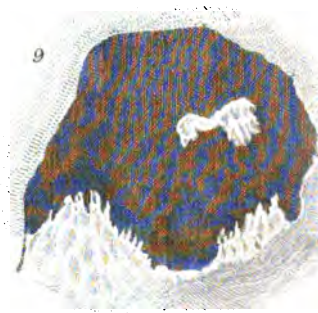
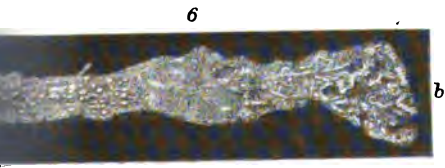
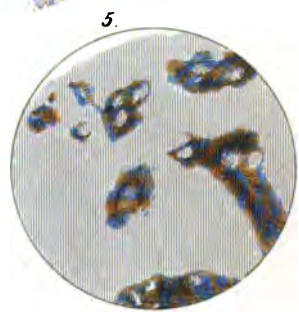
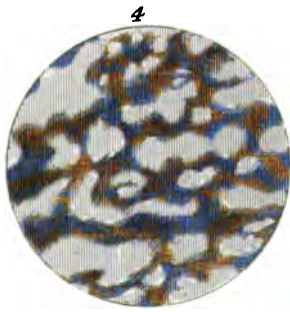
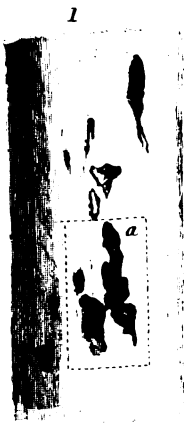


Fig 1



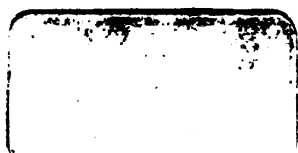


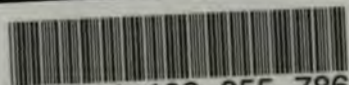




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